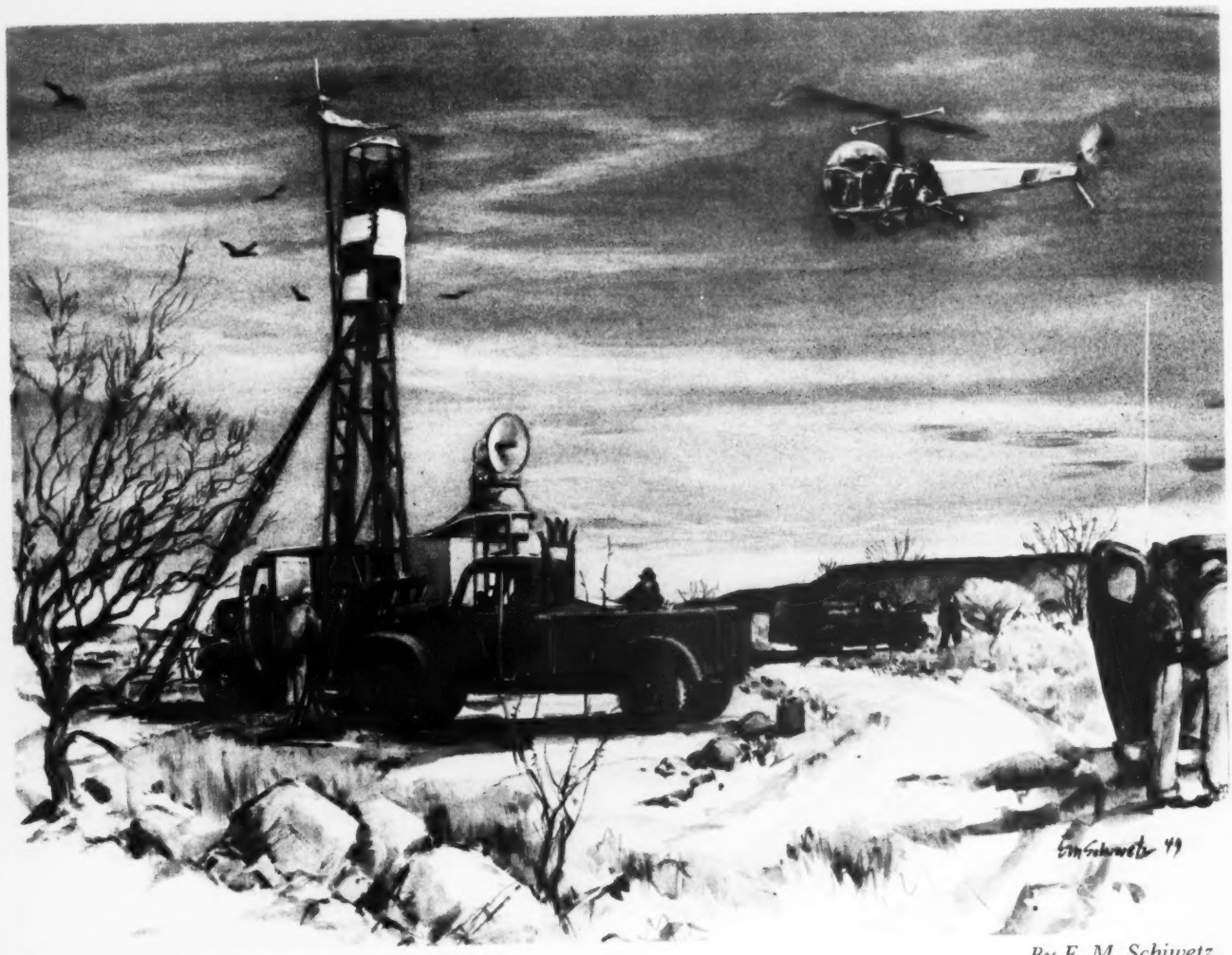
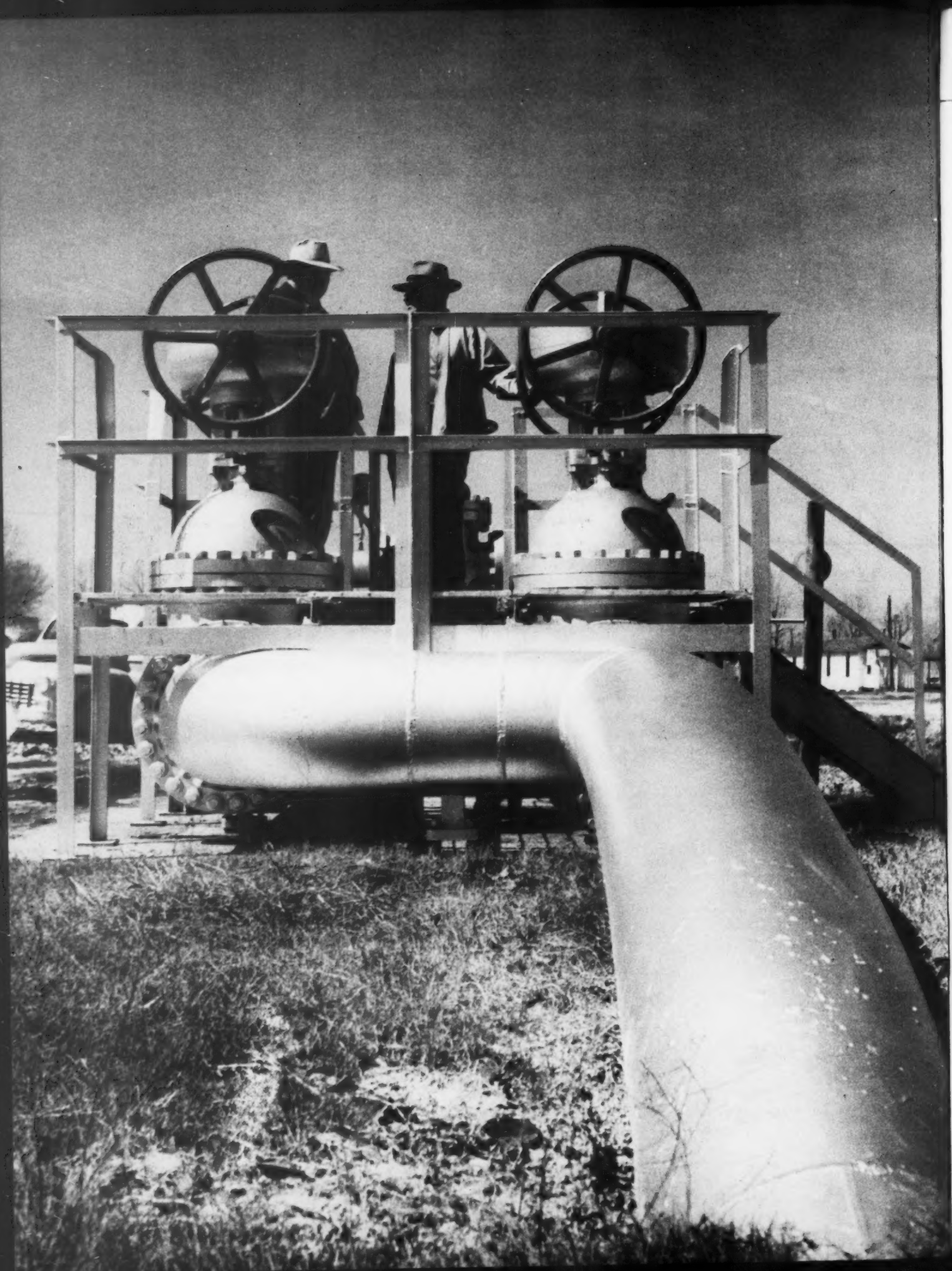


Exploring in West Texas

By E. M. Schiwetz

The HUMBLE WAY

MARCH-APRIL, 1949



The HUMBLE WAY

MARCH-APRIL, 1949
VOL. IV NO. 6

HUMBLE PLANS $155 MILLION INVESTMENT IN 1949

A CAPITAL investment program of $155 million in 1949 was announced early in April by Hines H. Baker, President of Humble Oil & Refining Company. The program represents an expenditure nearly 15 percent larger than the record investment in new facilities made by the Company in 1948. A year ago Humble announced an investment program for 1948 of $140 million; actual expenditures totaled $138,300,000 for the year.

In 1949 Humble plans to spend $123 million to accelerate exploration and drilling, to improve and increase general production facilities, and to construct new gas conservation plants.

The 1949 drilling program calls for the completion of 832 wells as compared with 768 drilled in 1948. Humble's natural gas conservation program will be stepped up in 1949 with the completion of plants that will conserve and utilize more than 250 million cubic feet of gas daily. Plants now under construction include those at Kelsey, Conroe, Pickton, Flour Bluff, Thompsons and Imogene in Texas, and Opelousas in Louisiana. In addition, two plants at Seeligson and Heyser have already been completed this year.

Humble's 1949 investment program continues the Company's established policy of re-investing earnings to provide more oil and improved quality products for the future. In 1948, because of heavy investments of capital, improvement in prices, and a continued vigorous and determined activity by the industry, supplies outran the increased demand. Now the industry again has a backlog of available developed reserves which contributes greatly to national security while allowing for the normal increases in the use of petroleum products that may be expected in an expanding economy.

1948 Investment Totals $138 Million

A year ago THE HUMBLE WAY carried an announcement that the Company was going to invest $140 million in new facilities during 1948, if enough steel and other materials could be obtained.

That $140 million estimate didn't miss the mark very far; in fact, it came within about one per cent of scoring a bullseye. When the books were closed for the year, more than $138 million actually had been spent to provide more of what Humble needs to carry on its business. Add to this the $26.5 million spent during the year on dry holes and other drilling that did not contribute to production, and total money risked last year rises to $164 million.

It has always been Humble's policy to invest part of each year's earnings in facilities to improve and expand Company operations. The $138 million spent in 1948 does not stand alone, but it is a record investment for a single year.

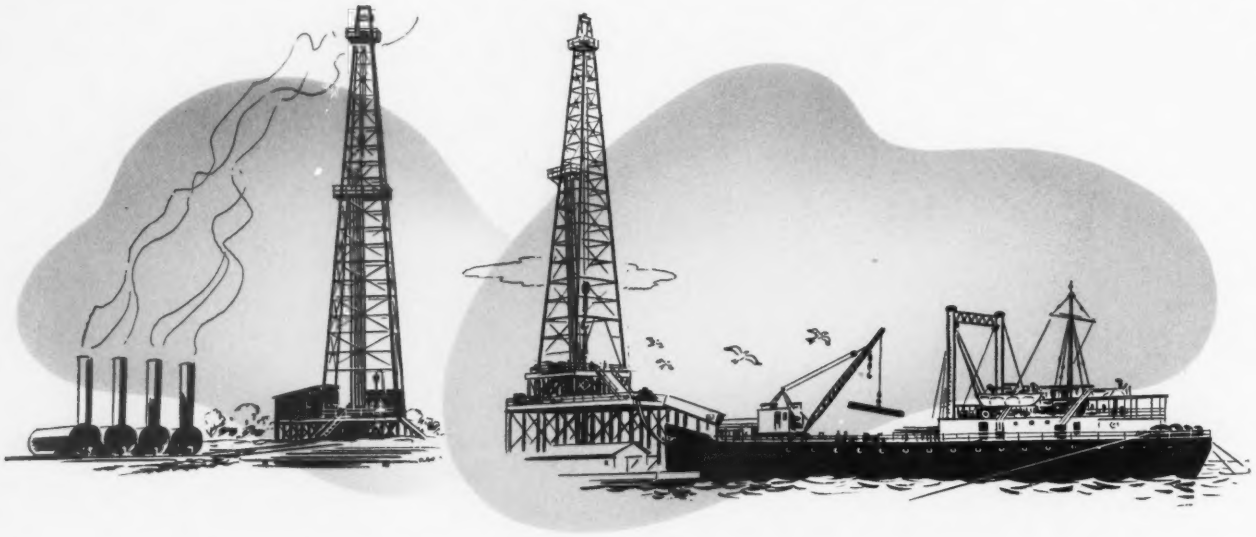
Measured by any yardstick, $138 million is a lot of money. It is nearly 50 per cent more than the money spent for capital investment in 1947, and represents about one dollar for every barrel of oil produced by the Company in 1948. It is more than Humble spent for new facilities during the first seven years of its corporate life, and as much as the Company's net income during its first 14 years.

But the real significance of investing $138 million in a single year lies not in cold figures, however impressive those figures may be. The real story should be told in terms of the influence such an investment has on the lives of people—on the lives of employees, stockholders. and customers. That $138 million was put back into the business last year to provide more oil in the years ahead, to maintain present jobs and make room for new ones, and to insure stockholders a fair return on their investments.

Humble is part of an industry that is dynamic, growing, vigorous, and progressive. The Company, like the industry as a whole, has only one way it wants to go, and that is ahead. To get there, it must continue to invest new money every year in tools, machinery, plants, equipment, and all the other expensive things it takes to carry on the oil business. Last year, for example, the oil industry invested more than two billion dollars. Humble's $138 million was about six per cent of the industry total, well in keeping with the Company's position in the industry.

Satsuma Station chief engineer H. H. Hetzler and refinery stillman Paul H. Mears check big valves on 20-inch crude oil line to Baytown refinery. (See Page 24.)

How Humble's Record-Breaking 1948 Investment Was Divided:



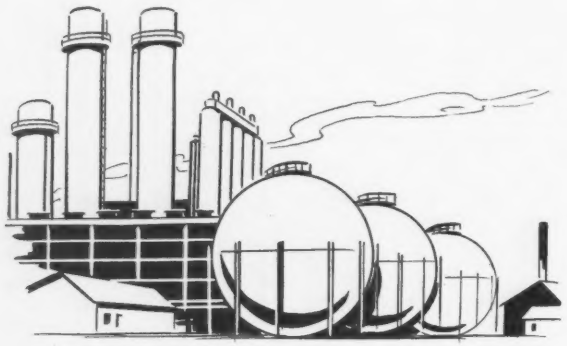
Production

Naturally enough, in a year that combined high costs and increased production activity, the bulk of the money—$108,355,000 of it—was spent in production operations.

More than $48 million of this total was spent on successful drilling, in addition to the dry-hole expense of $26.5 million already mentioned. A better way to understand the magnitude of such drilling expense is to look at it on a per-day basis. With about 100 rigs operating during the year at an average cost of about $2000 per day per rig, *Humble's cost of drilling was well over $200,000 per day*. Since one-third of all the money spent on drilling was for dry holes, it might be said that *every third day that $200,000 was completely lost!*

The oil industry is used to risk-taking; it has to take risks to stay in business. The money Humble lost in drilling dry holes was not lost carelessly; every hole was drilled only after careful checking had given good cause to expect that oil might be found there. The fact that a large number of holes were dry merely bore out the long-established rule that you don't strike oil every time. In the oil business, you drill your hole and you take your chances, no matter how good your pre-drilling information might be.

The matter of gas conservation, a subject of increasing importance and interest during recent years, was given the emphasis it deserved last year. Always a leader in conserving gas resources, Humble added to its already large investment in conservation facilities by spending more than $12 million in 1948 on cycling plants, repressuring plants, absorption plants, and the machinery and equipment that go with such



plants. Reducing that figure to more understandable terms, *Humble invested nearly a quarter of a million dollars every week in the year* to conserve valuable supplies of natural and casinghead gas.

Throughout the year, Humble spent about $11 million—

nearly a million dollars a month—to equip leases with pumps and other equipment that will add to the life and increase the productive efficiency of Humble wells. The bulk of this investment was spent in Texas, of course, and much of it was spent in the Houston area with companies manufacturing and selling oilfield equipment.

The Company invested nearly $18 million last year buying leases. This bonus money paid to landowners *averaged a million and a half dollars every month*, or $50,000 a day, about 113 per cent more than was spent for the same purpose in 1947. Significantly, probably not one in ten of the leases acquired in 1948 will ever produce oil. In an industry characterized by competition and risk, however, each company must lease while it can, or a competitor will take the lease for itself. Since only a drilling bit can prove or disprove the presence of oil, every company knows beforehand that it must take the bad along with the good—the many unproductive leases along with the few productive ones. Whenever a company has reason to believe a certain area may contain oil, it has no way of pinpointing only those leases that will be productive. In an effort to play as safe as possible, it has to lease a large part of the area; more than could ever be expected to produce oil.

Slightly more than $9 million was invested during 1948 in marine equipment, a logical and necessary outgrowth of Humble's expanded activities searching and drilling for oil in the Gulf of Mexico. Developing this newest oil frontier is expensive, and last year's investment in marine equipment went largely to provide more drilling tenders, more offshore

platforms, improved onshore base installations and facilities—more, in fact, of everything needed to carry on operations connected with the expensive and complicated task of drilling for oil at sea.

Another $11 million investment in production facilities during 1948 was divided as follows: Nearly $4 million classified as "district investment"; that is, money spent on building up and improving employee field communities and the like; about $5 million on new and improved drilling equipment; and about $2 million on field service lines, including lines for disposing of salt water produced along with the oil from wells.

Refining

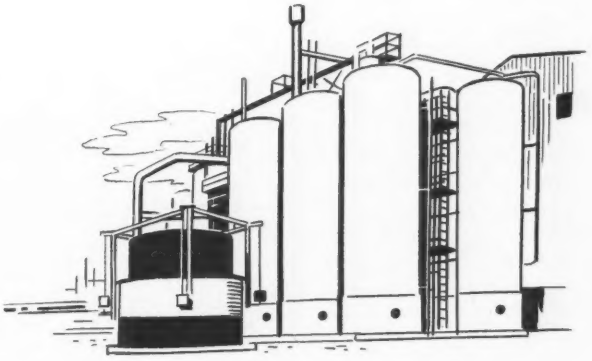
Humble likewise made substantial investments in new refining facilities during 1948.

To maintain its competitive position as a petroleum refiner, Humble made improvements and additions to Baytown refinery that will keep the plant progressively modern. For example, the older type *shell stills* are gradually being replaced with modern-type *pipe stills*. Construction was begun last year on Pipe Still No. 4, an efficient new distillation unit that will process some 55,000 barrels of oil a day.

Improvement of product quality to keep ahead of competition is ever in the progressive refiner's mind when plant additions are being considered. Humble completed at Baytown refinery last year a new motor oil processing unit—the MEK Solvent Dewaxing Unit—that has made it possible to increase production of premium motor oils by virtually 100 per cent.

Also at Baytown, construction was begun in 1948 on the new Central Shops Building, which eventually will house all the mechanical crafts in the refinery. In this building will be the most modern and complete equipment money can buy for such crafts as machinists, carpenters, riggers, boilermakers, instrument men, insulators, brickmasons, tinners, welders, and all the other skills necessary to keep a plant like Baytown refinery in first class running order. As a result of this centralization and of the new machinery and equipment to be provided in the Central Shops Building, repairs and maintenance work can be done more efficiently than ever before.

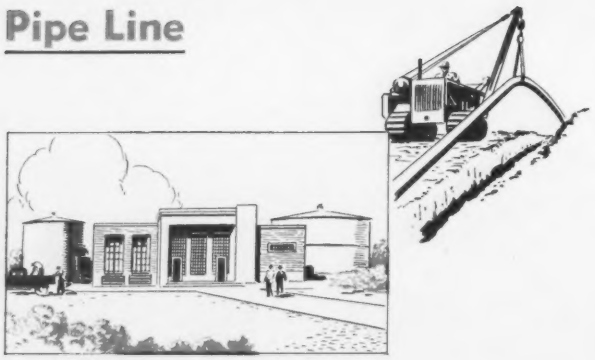
Since refining progress and research go hand in hand,



Humble showed its interest in the future by beginning construction last year on a large and complete Research Building at Baytown. In this building, with the superb equipment it will provide, Humble scientists and research specialists will work on ideas for improving products and techniques, as well as on ideas for completely new products and processes. From this flow of ideas will come new life and vigor for the slogan: "Continuous Improvement Keeps Humble Ahead."

While the projects just outlined were major ones, a number of smaller additions and improvements were important, too. Baytown's utilities—the light, water, steam, fuel, power, and other utilities necessary to keep the plant going—were expanded and made more efficient. The plant's disposal system for waste products was improved, typical of Humble's desire to conduct itself like a good citizen in the community.

Pipe Line



During the past few years Humble Pipe Line Company has displayed an unusually high degree of energy and ingenuity in getting more and still more oil through its lines. In time of need, as the last few years have been, Humble has literally strained to deliver the last possible drop of oil. Wartime expansion was restricted, of course, consisting mainly of loops to reduce friction in the lines. When the supply situation tightened in postwar years, emergency measures were taken to move still more oil through the lines, and even so some oil had to be moved at high cost by rail from West Texas to the Gulf Coast.

In 1948, at last, some relief was possible. During the year, Humble invested $11,265,000—virtually a million dollars a month—in facilities that would relieve the strain at overworked pumping stations and through overworked lines. About five million dollars was spent on new pumps and machinery for stations, so that a high rate of delivery can be maintained more efficiently and at less cost and effort.

The second largest pipe line investment was about $2,750,000 for gathering lines. These lines connect main lines with more oil wells, thus serving the interests of everyone—landowner, royalty owner, producer, purchaser, and consumer alike.

With 1948's investment, it is expected that pipe line capacity has caught up with demand at least temporarily. Humble's lines have been operated at high costs for some years, simply because the Company felt responsible for moving as much oil as possible through available facilities.

Sales

The average consumer knows and understands very little about the exploration, production, pipe line, and refining ends of the oil business. He comes to know, and forms his opinions, about an oil company through his experiences at his neighborhood service station. Competition in retail sales in the oil business is especially keen, with the motoring public demanding (and getting) high standards of product quality, service, cleanliness, and courtesy for the dollars it spends on gasoline and oil. How well Texans have accepted Humble on all these counts is shown by this amazing success story: Since 1945, Humble has moved from fifth to second place in retail sales in Texas.

To help the Sales Department make such a good showing, Humble invested about $5 million in Sales facilities during 1948. More than $2 million of that total was spent on retail service stations; an almost identical sum was spent on bulk plants to serve retail stations in a widening marketing area. With these new stations, and with an enlightened, aggressive program of training, advertising, and sales promotion, the Sales Department has set out to "Make 1949 the Best Year Yet."

Another major Sales investment last year, costing about half a million dollars, was the improvements and additions made at the Specialty Manufacturing Plant in Houston. This plant produces the well-known line of protective coatings and RUST-BAN products, as well as cutting oils, emulsion breakers, detergent cleaning compounds, insecticides, and the like.

Crude Oil Marketing

A new dock—Dock No. 5—on the Houston Ship Channel just across from Baytown refinery was completed in 1948.

Dock No. 5, 42 feet wide and 400 feet long, is fireproof, built of concrete and structural steel. It can accommodate the largest tankers now afloat and even larger ones now under construction—the sea-going giants that will be able to carry almost a quarter million barrels of oil in one cargo. Dock No. 5 is part of Humble's answer to the increased need for oil along the Atlantic seaboard states, where the heaviest demand for oil in the U. S. is concentrated.

Why Investments Are Necessary

Investments from year to year are necessary so that the Company can keep moving ahead. Yet it must be kept in mind that there is *purpose* in Humble's progress. Unlike the Queen in *Alice in Wonderland*, the Company isn't "running just to keep from standing still." Indeed, there is no such thing as standing still in the oil business; you go forward or you go back.

Humble's investment during 1948 is an investment in the future. It is part of the Company's pledge to employees, stockholders, and customers that Humble intends to keep up its purposeful progress during the years ahead. Interpreted literally, that progress will mean more and higher quality products for public use and substantial contributions to national security.

When Winter Struck

Emergency Communications

Kept Oil Moving

"Ham" radio operators help Pipe Line Company make deliveries when sleet storm isolates West Texas area

BECAUSE the transmission of petroleum through pipe lines, like the movement of trains over rails, is dependent upon coordination and careful timing, the maintenance of good telephone and telegraph communications is essential.

Imagine then the crisis in Humble Pipe Line Company's West Texas division in January when a severe sleet and ice storm snapped poles, snarled lines, and isolated personnel at the various pumping stations and offices.

Yet when normal communications were restored several days later, there had been no interruption of operations because of the outstanding public service rendered by 23 Company employee and non-employee amateur radio operators. Responding to the emergency, these "Hams," located in eight cities and towns, established and maintained a smooth-functioning network for relaying vital information between the stricken areas and Houston office dispatchers.

Although one pipe line developed a leak, the "Hams" transmitted necessary communications like veterans, and enabled remedial personnel to stop pumps, dispatch repair gangs, and start pumps again in record time. They also relayed other emergency calls to Humble's Communication Department for further handling.

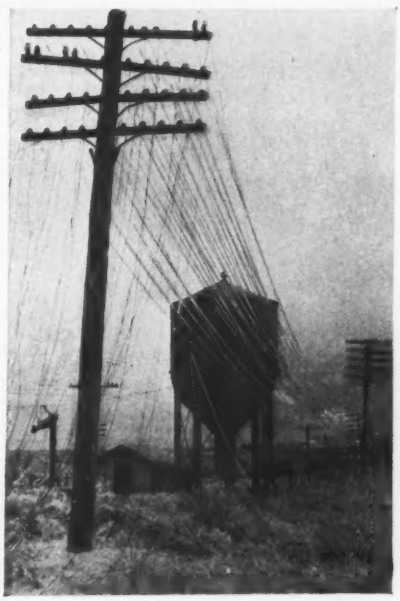
One "Ham" moved his equipment more than 200 miles to a key point in the isolated area, only to find that communications had already been established from there. He then moved to another critical area, 150 miles away, and set up another relay station.

Resourcefulness was displayed by another "Ham" who operated from the Dispatcher's office in Houston. He established radio-telephone contact between that office and a local amateur station whose telephone, a party line, was not available for immediate use in relaying information as it was received.

The unselfish service of the operators, the tireless manner in which watches were maintained, and the marked degree of helpfulness throughout the emergency reflect the highest credit on each "Ham" who participated.

This prompt, decisive action assisted materially in preventing possible fire hazards or pollution of streams due to high pressure line breaks, costly field shutdowns, or the bottling up of ocean-going tankers. Perhaps even the curtailment of refinery operations was avoided, for Humble Pipe Line Company normally delivers 131,000 barrels of oil every day from its West Texas division.

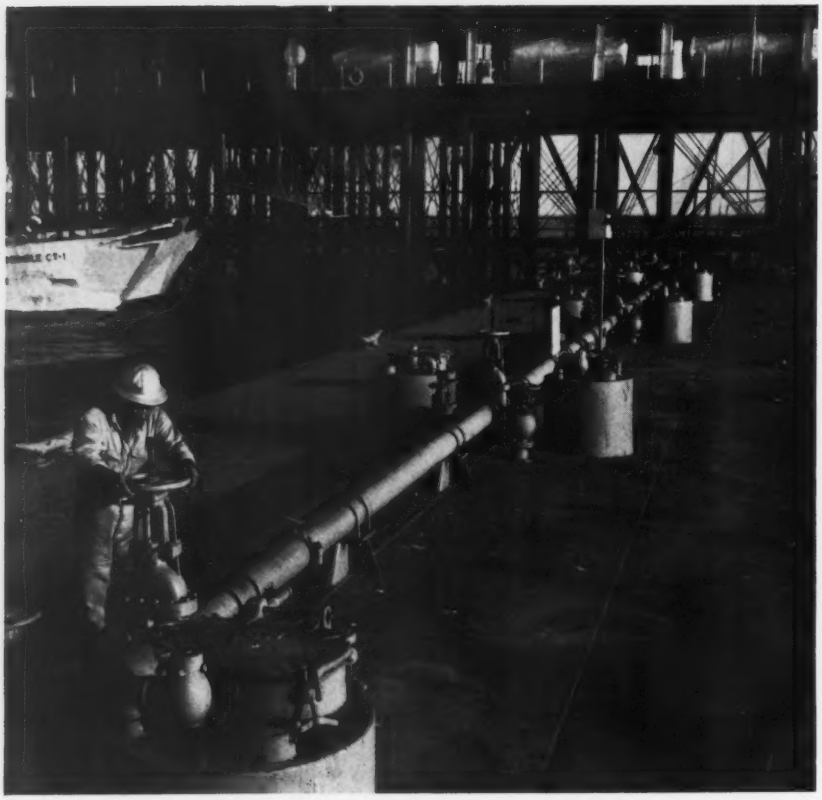
Radio-telephone operator maintains contact with a Houston amateur station as information is relayed. Dead lines dangle like May-pole streamers, (right).



Tugs and barges often wallow through rough seas and blustery winds en route to offshore drilling platforms.

Crude oil discharged, tug moves two empty barges down Mississippi River under Huey Long Bridge above New Orleans.

BRINGING OIL IN FROM *OFFSHORE WELLS*



FINDING oil beneath the continental shelf off Louisiana and Texas is an extremely difficult and expensive task. Thirty-five oil companies have spent vast sums for exploration and for drilling more than 60 wells in coastal waters, of which only eight are oil wells and four are condensate wells.

Like other offshore operations, transporting the crude oil produced from those wells to land is handicapped by high waves and winds. Heavy seas are a constant threat to loading and movement of barges, the only method used so far to move oil to shore.

Humble uses eight barges for transporting the crude oil produced from the Company's five oil wells in the waters off Grand Isle, Louisiana. The largest barge, No. 100, (195 feet long, capacity 9,500 barrels) is shown at left receiving the production of the two oil wells on Humble's Grand Isle No. 1 platform seven miles off Grand Isle. Two of Humble's oil wells are at Caminada Pass, six miles west, and one is at South Timbalier, 45 miles southwest of the large platform.

After a barge is loaded, it is towed

Pumper switches oil production to different tanks on Barge No. 100. Two wells on large Grand Isle platform (background) produce to barge simultaneously.

to Avondale, Louisiana, on the Mississippi River above New Orleans, where the oil is discharged at a pipe line terminal. A seagoing tug hustles the oil barge from the drilling platforms to Humble's Grand Isle terminal. There a small inshore tug continues to tow through Barataria Bay and the bayous and canals to the Mississippi River at Harvey, Louisiana, across from New Orleans. From Grand Isle No. 1 platform to Avondale is about 65 miles by water, and the tow takes about 12 hours.

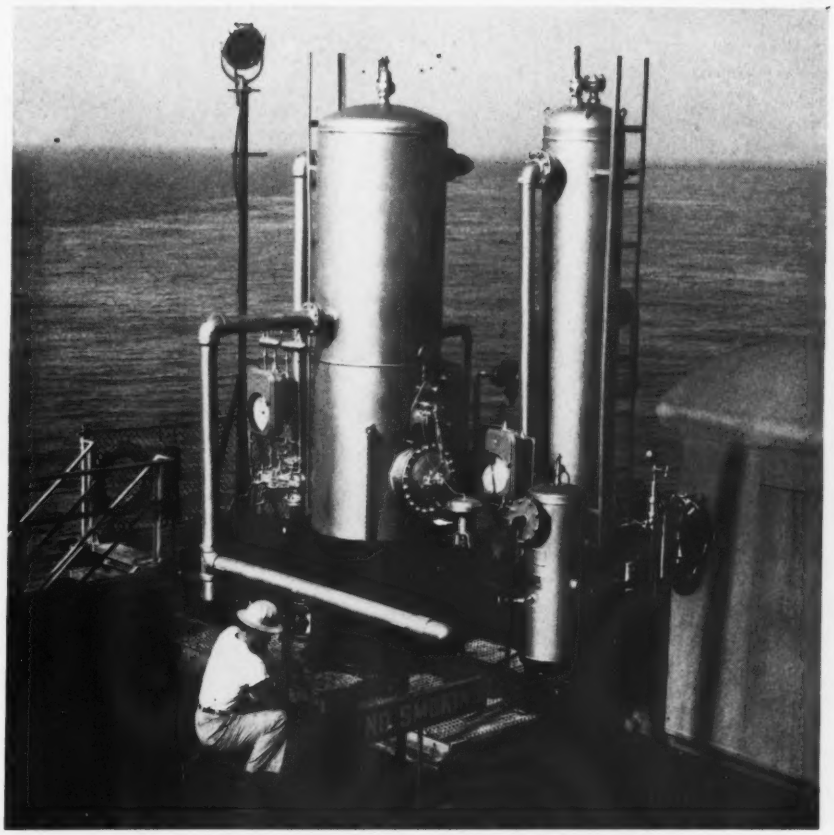
A barge is kept alongside each platform loading continuously as the weather and waves permit. After the crude oil is discharged at Avondale, the empty barges are returned to the Grand Isle terminal until needed.

The bayous and canals between Grand Isle and Harvey are rather shallow, and traffic is limited to boats with a draft of five feet or less. For this reason, Barge 100, although of 9,500 barrels capacity, may be loaded to only 6,000 barrels. Humble's other barges, of 6,500 and 3,000 barrels capacity, also may be only partially filled to keep within the five-foot draft limitation.

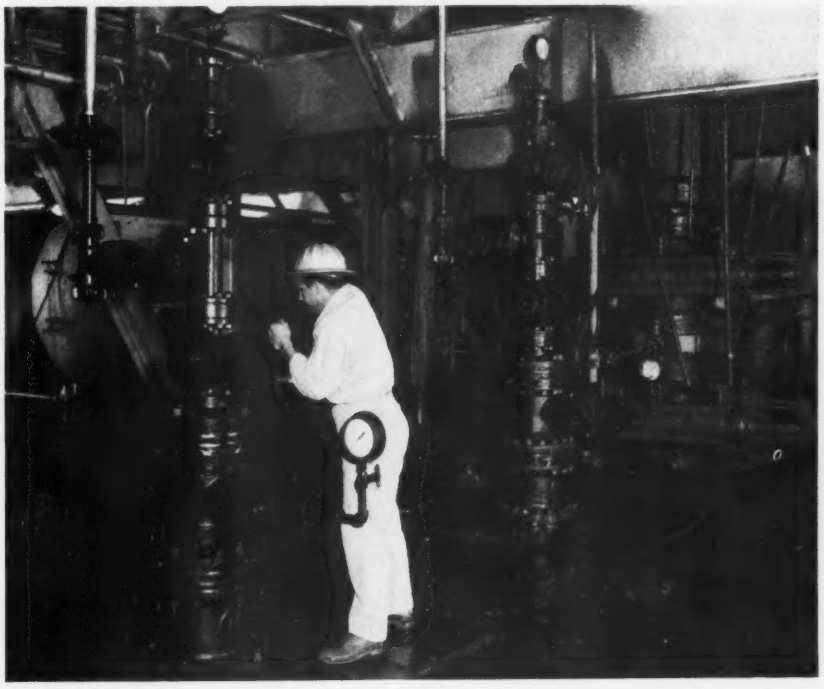
Like oil wells on land, offshore wells have allowables set for good production practice, and barges must remain alongside the platforms for several days to receive a cargo of crude oil. Twelve days or more are required to load Barge No. 100 from the two wells on the Grand Isle No. 1 platform. Even more time may be necessary if the barge must be cut loose from the platform when the waves became too high.

The barges are also moored to a special mooring buoy secured about 300 feet from each platform by four heavy anchors. If a barge is cut loose or breaks free from a platform, it will swing from the buoy until again moved to the platform after the high waves have subsided. Offshore oil transportation costs have been substantially reduced by the use of the mooring buoys, as the need for a tug constantly standing by is eliminated. Tugs are now needed only for moving the barges.

Humble's engineers are continuing extensive studies to develop an efficient method of transporting offshore oil more easily and inexpensively. An alternate method, underwater pipe lines, is under consideration, but must await field development to make the projects feasible. Conservative estimates set the cost of an eight-inch underwater pipe line 20 miles long, properly laid and protected, at three to four times the cost of a similar line laid on land.



Oil and gas separators are located on top deck of Humble's Grand Isle No. 1 platform seven miles off the coast. Pumper takes a sample of oil being produced.



Pumper closes valve on Grand Isle discovery well. Christmas tree of second well, blowout preventers of third well now being drilled are also on platform lower deck.

AMERICAN science and industry proved during World War II that rubber does not always come from trees. It was more than an academic triumph. Wartime development of plants and processes to manufacture rubber synthetically from oil and alcohol—and to make it by thousands of tons—was an industrial miracle that prevented the complete collapse of our war effort.

Many of the rubber plants and processes born in such travail have grown to stalwart citizenship and have taken on increased importance in our peacetime economy. Indeed, postwar products of these plants are so superior to natural rubber in some respects that it seems unfair to stigmatize them with the term "artificial," which is frequently used for manufactured rubbers. "Synthetic rubber," or some such term, seems more in order.

Butyl is one of the newest of these manufactured rubbers. It is produced entirely from petroleum; in fact, it gets its name from *isobutylene*, the refinery gas from which it is made. Butyl is not to be confused with its near cousins, the Buna rubbers. Buna is used predominantly for tires; Butyl for inner tubes. Besides being far superior to natural rubber for making inner tubes, Butyl has proved satisfactory for a number of other uses.

The idea that Butyl could be made from oil was born in this country more than 15 years ago, when research scientists of Standard Oil Development Company were experimenting with additives to improve lubricating oils. One additive under research was a laboratory curiosity ranging from a solid to a thick, syrupy liquid. It was *polyisobutylene*, a hydrocarbon compound made by joining together many molecules of isobutylene. Research men were fascinated with the stuff. They kept combining the isobutylene molecules in various ways in the laboratory until finally they came up with a new substance that looked and acted somewhat like rubber. There were two exceptions; it couldn't be vulcanized and it wouldn't bounce.

The Right Combination

Like all research men the world over, those who carried on these experiments were not discouraged by early failures and disappointments. They kept working, kept trying various combinations of isobutylene with other compounds until they hit upon a mixture of *butadiene* and isobutylene, both of which are gases at normal temperatures and pressures.

The product of this new combination could be vulcanized, and after vulcanization it would stretch and return to its original shape; it had tensile strength and resilience; it was tough and would wear well; it resisted heat, oxidation, and the attacks of acids.

A Point Is Proved

The research people had proved in the laboratory that a new type of rubber could be made, using raw materials derived solely from petroleum. But at that stage, producing it commercially on a large scale was out of the question. Much further research and development would be necessary, and a tremendous investment in plants and machinery would have to be made before the process could be geared to mass production. Natural rubber was still available, and synthetic rubber could then not hope to compete with it on a cost basis.

Nevertheless, in spite of early prejudice against synthetic rubber and the apparent high cost of production, the creators of Butyl were sufficiently optimistic to carry on large scale research and secure approval, several months before Pearl Harbor, for the construction of a plant to produce twenty tons of Butyl a day. This plant was built at Baton Rouge, Louisiana, by Standard Oil Company of New Jersey (now Esso Standard Oil Company). Although this plant was small compared with the huge plants operating today, it was very large for a first venture in which there were so many risks involved.

Pearl Harbor converted Butyl from a laboratory curiosity to one of the essential materials of war. Plans for the Baton Rouge project—still under construction—were enlarged at once, and other oil companies (Humble among them) were called into the task of building Butyl plants immediately. In the urgency of the times and in the interest of natural security, Standard Oil Development Company agreed to license anyone for the production of Butyl during the war without royalty and after the war at a reasonable royalty.

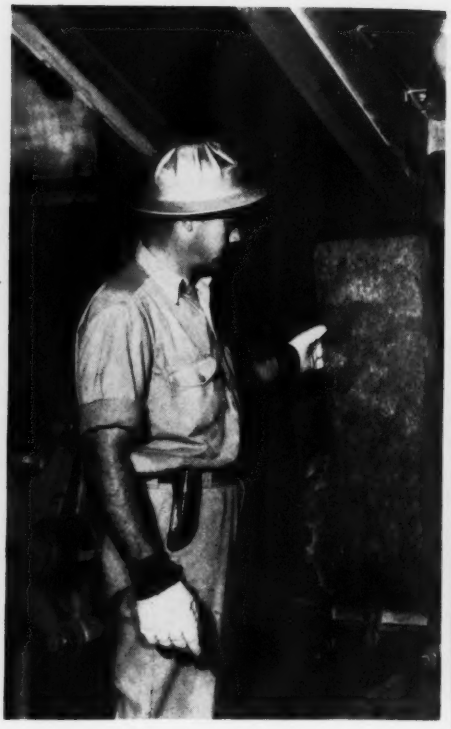
How well industry met this wartime challenge—how well it brought an entirely new process to large-scale production almost on the spur of the moment—is history. It is enough to say that synthetic rubber changed the whole course of the conflict.

How Butyl Is Made

The Baytown Butyl plant, built and operated by Humble for the government, consists of three sections: (1) the feed preparation unit, where the iso-

Ice forms on uninsulated equipment; temperature at which reaction occurs to form Butyl is more than 100 degrees below zero Fahrenheit. Rope-like line on which operator adjusts valve is quarter-inch copper tubing covered with ice. Butyl rubber (below), in white fluffy particles like popcorn, comes from the reactors to the finishing house.

In conveyors, on the way to further drying and pressing, Butyl particles look like grains of cooked rice. Hot air tunnels dry Butyl and it emerges as a dry mat to be broken up in hammer mill breakers. It goes next to extruders, and to roller mills.



At finishing mill, Butyl rubber has golden amber color. It lost the last of its water at hot roller mill just above finish-

butylene is extracted from a mixture of liquefied refinery gases; (2) the polymerization unit, where the chemical reaction that forms Butyl takes place; and (3) the finishing unit, where particles of rubber are dried, pressed into sheets, cut, and packed.

After isobutylene is extracted and purified from a mixture of butanes and butylenes sent over from Baytown refinery, it goes to the polymerization unit, where it is mixed with *isoprene*, another oil derivative similar to butadiene and which was found by later research to be superior to butadiene. Polymerization, in the refiner's language, means linking molecules together. In the case of Butyl rubber, thousands of small molecules are joined together to form one large molecule which has vastly different properties than the small molecules from which it is made.

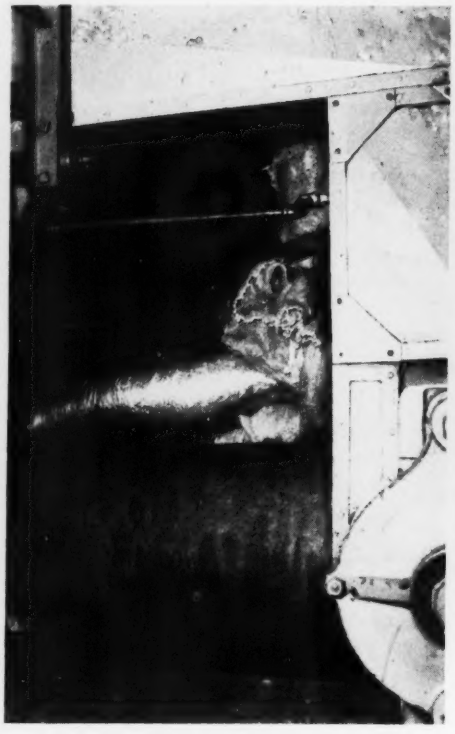
The reaction that forms Butyl calls for a rather unusual process that chills the reaction mixture containing isobutylene and isoprene colder than 100 degrees below zero Fahrenheit. It is hard to imagine temperatures colder than 100 degrees below zero, and it is unusual to maintain them in an industrial process. Early operations were plagued by difficulties arising from this entirely new process involving such extreme temperatures. And, as any operator or technical man at Butyl plants will verify, the Butyl process still requires skillful control at all times.

A liquid catalyst is injected continuously into the reaction mixture while the unit is operating. This catalyst makes the isobutylene molecules join hands with themselves and with the isoprene molecules to form Butyl rubber. Each Butyl molecule is made up of several thousand isobutylene and isoprene molecules in the ratio of about 50 of isobutylene to one of isoprene. The product from the reactor, containing Butyl in the form of very small particles, overflows into a flash tank half filled with hot water. Here the unreacted materials evaporate, leaving the Butyl suspended in the water. At this stage, the Butyl agglomerates into fluffy white particles resembling popcorn.

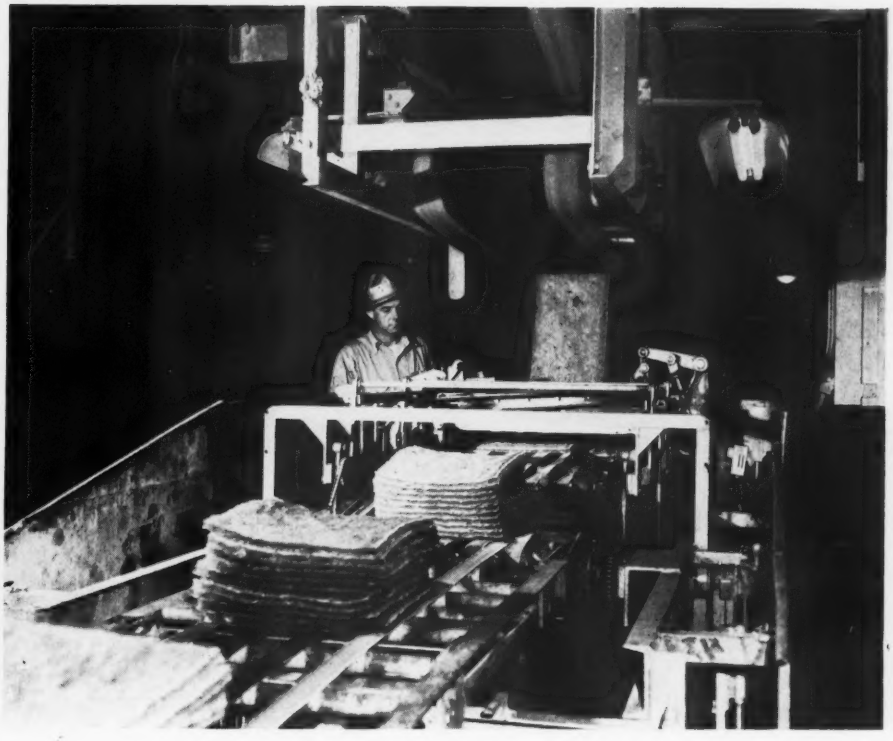
A Butyl rubber slurry (rubber particles suspended in water) goes to the finishing unit. Here it passes over filters which separate the rubber from the water. Moisture is then removed in hot air tunnel driers, and Butyl emerges as a fairly dry mat, to be broken up in hammer mill breakers and sent to the extruder.

In the extruder, by heat and pressure, still more moisture is removed and the Butyl travels to heated 100-inch

Insulation for electric wiring is one of the industrial uses of Butyl. It does not break down under high tension current.

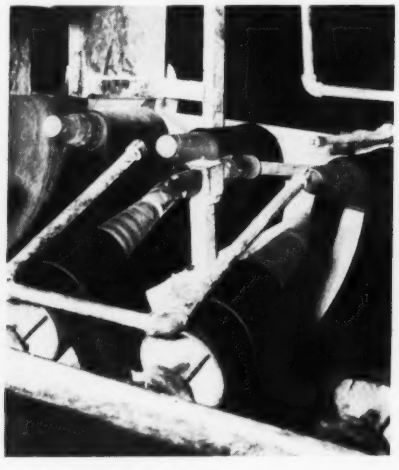


ing mill. Roller at bottom presses the Butyl into a compact roll, from which automatic knives cut a running ribbon.



A continuous ribbon of Butyl comes through cooling conveyors from roller mills to the cutting machine. Knives cut squares from this ribbon. The squares are stacked in neat groups and conveyed to the packagers, who place them in boxes.

steel roller mills. The next trip is to finishing mills, where the rubber is formed in sheets about a quarter of an inch thick. Rubber is cut from the finishing mill by automatic knives into a ribbon about 14 inches wide, which travels through cooling conveyors to the cutting and stacking machines.



Inner tube manufacture uses most of Butyl produced. Butyl tubes hold air ten times better than natural rubber.

Cutting and stacking machines cut the rubber into neat 14-inch squares, stack the squares, and convey them them to the packagers who place the squares in specially coated boxes. After going through a sealing and gluing machine, boxes are conveyed to the storage room, where they are weighed and held for shipment to the companies that will convert the Butyl into finished products.

Place of Postwar Butyl

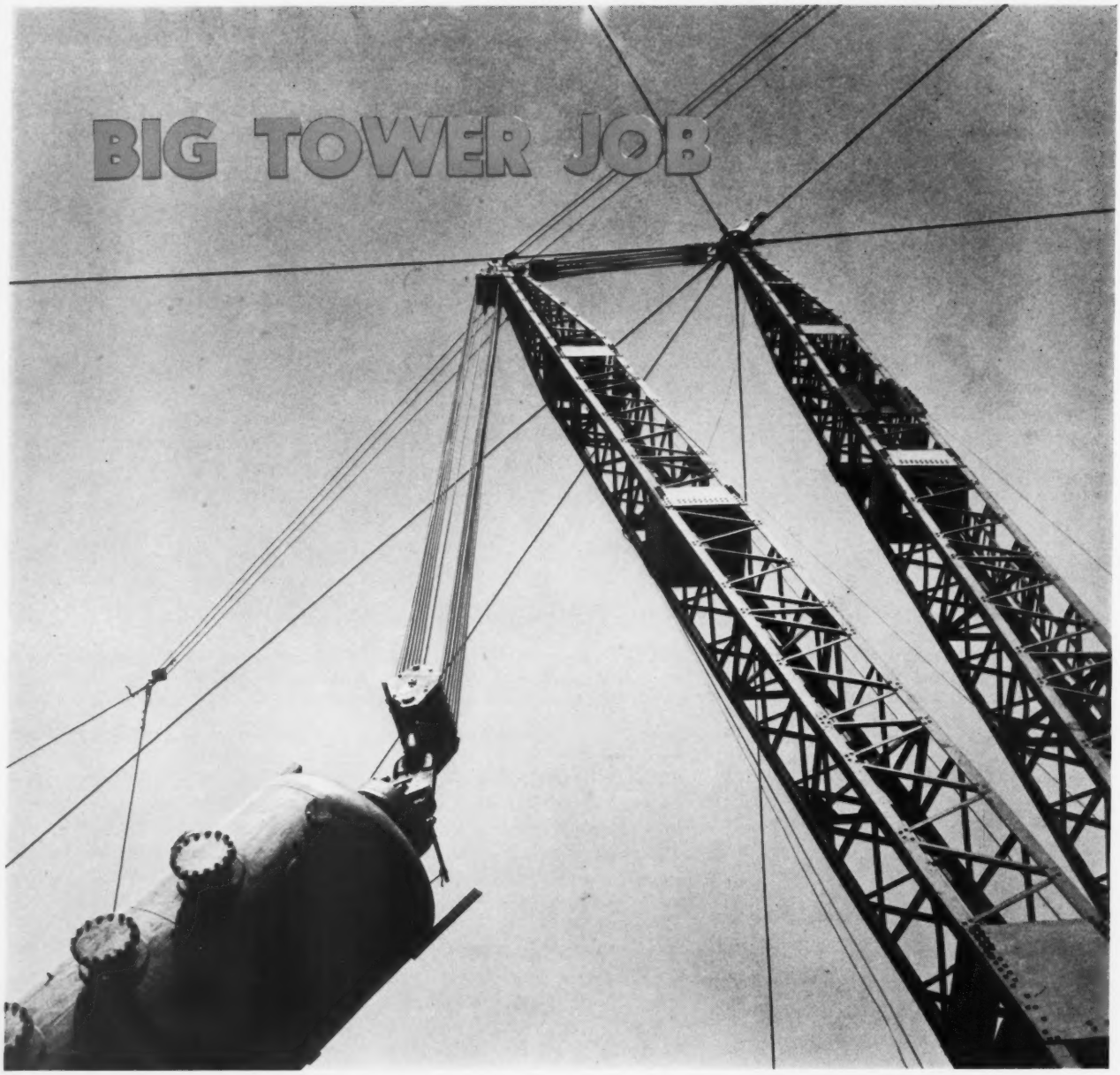
The manufacture of Butyl rubber is one of the wartime projects that did not close its doors after the last shot was fired. Now, in time of peace, there is little slackening of demand for this valuable product. Principal peacetime use, as it was in war, is in the manufacture of inner tubes, for Butyl tubes are as durable as (if not more durable than) natural rubber tubes and hold air ten times better. The Butyl tube's ability to hold air not only saves the motorist many a trip to the service station; it saves his tires and conserves his gasoline. Road tests have shown that reducing air pressure by as little as four pounds cuts the life of tires by more than 15 per cent. and, on level roads, increases gasoline consumption by as much as eight per cent.

Other Butyl qualities make it useful for a number of products besides inner tubes. It does not crack or crumble, even after long contact with high-tension electricity, and so is valuable for insulating electrical wiring. It sticks tightly to fabrics, leather, cork, and wood. It resists acids and gases, and its resistance to heat makes it a valuable material for curing bags used in the manufacture of tires. Many automotive mechanical parts are made of Butyl, and in the future Butyl is expected to be a competitor of other synthetic and natural rubbers for farm tractor tires.

Thus, while Butyl was one of the hardest of all manufactured rubbers to bring to large-scale production and still remains a process requiring skillful control, it was proved to be one of the most useful of all rubbers that do not come from trees. Continued research and development is making it better all the time, and is opening up more uses for this versatile solid that comes from gas.

Thanks to the ingenuity and energy of American industry, Butyl is here to stay.

BIG TOWER JOB

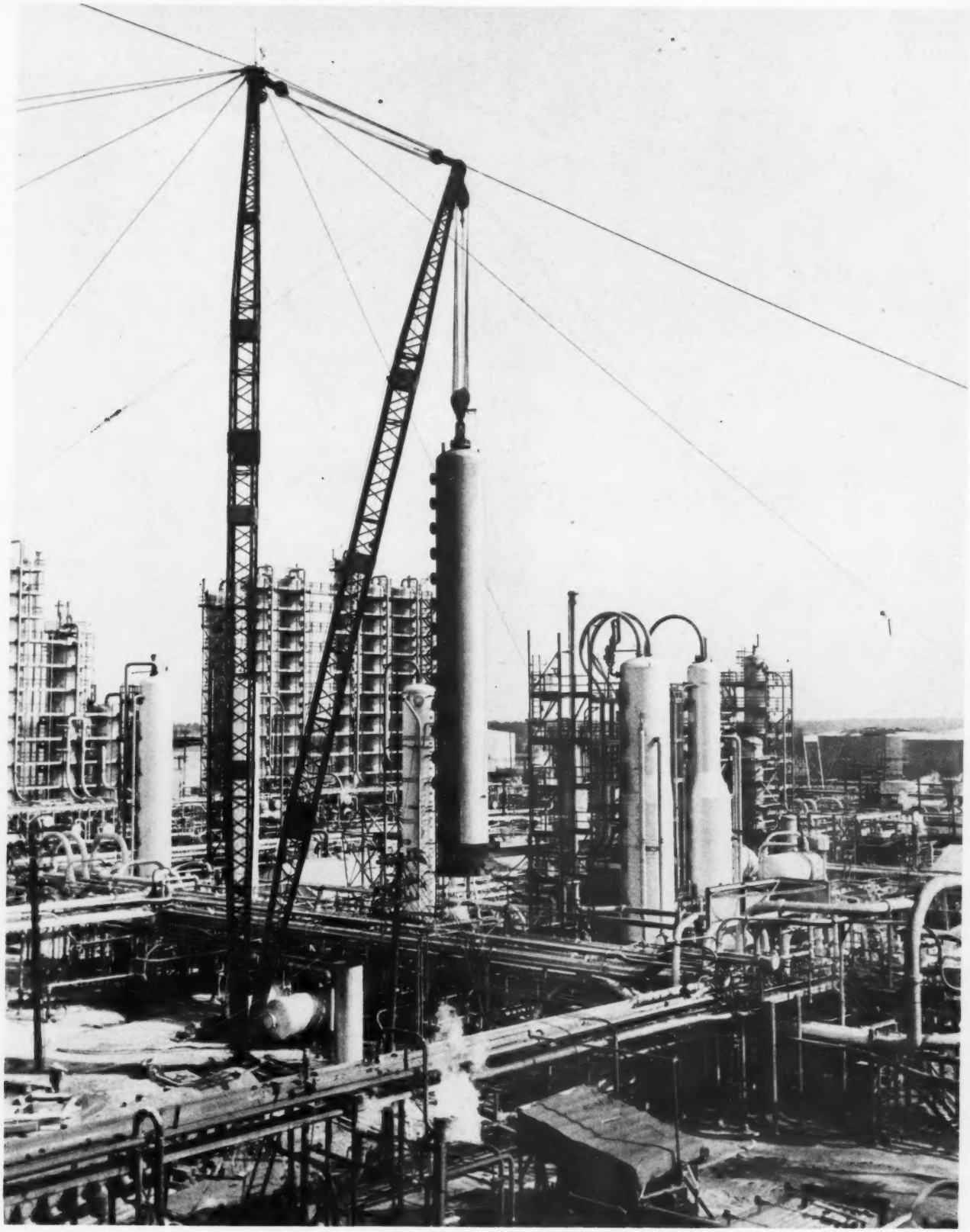


EVERY man who has been summoned away from the pleasures of his pipe and newspaper to move furniture and carry boxes of old magazines to an overstuffed attic has longed for a portable crane in his living room. Yet, if the husband-turned-stevedore thinks his tasks are complicated by balky pianos, wifely indecisions, and distractions from the children, he should try his hand at rearranging the "furniture" at a place like Baytown refinery. While he might be comforted by the logic behind the need for replacing a fractionating or absorption tower, he would be stunned at the planning and effort it takes to do such a complicated job.

Tremendous power was needed just to lift the 63-ton tower, measuring 7½ feet across and 67 feet tall, that replaced Absorber Tower No. 7 in the light ends area of Baytown refinery last year. And that power, tremendous as it was, had to be controlled with pinpoint precision when the tower was raised high in the air and then lowered unerringly into place among a maze of pumps and piping with never more than an inch of clearance to spare! Add to this the postscript that the old tower was lifted out and the new one lowered into place and put in service within 48 hours without accident or incident of any kind, and it makes a story of real accomplishment. It is the sort of thing that results from the highest type of planning, skill, and teamwork.

In the home, as any man can verify, things sometimes are replaced simply because someone gets "tired of looking at the old one." There was a better reason for replacing Absorber Tower No. 7. Over a period of years, the tower had become so corroded from gas streams flowing through it that it had to be condemned.

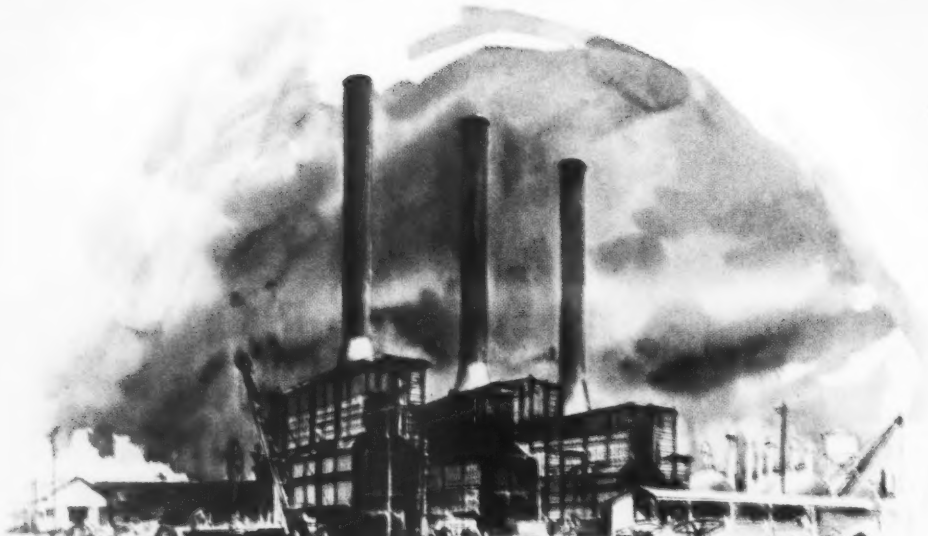
The pictures on these pages tell a graphic story of the big swap.



Tremendous power, careful planning, and pinpoint control combine to lift the old obsorber tower from its position among a maze of pipes and machinery in the crowded Light Ends area of Baytown refinery. New tower may be seen on ground at lower left.

Building for To

IN 1948 HUMBLE invested m
million in new facilities and equi
mately one dollar for every barrel
by the Company during the year.
an effort to interpret this large-sc
THE HUMBLE WAY commissione
Schiwetz to visit operations and to
strokes some of the main activities sho
how the money was spent. Schiwetz
refinery and several gas plants;
prairies of far West Texas with a g
he sketched a pipe line crew in the
West Texas; and he paused to observe
service stations fit into the pattern o
Texas communities. On the cover and
are reproduced the watercolor paintin
captured the feeling of activity and
broad base on which Humble is build
share of today's and tomorrow's pe



Additions to gas plants and construction of new facilities accounted for an investment of more than $12 million. This scene is at Katy Cycling Plant where a major addition is scheduled for completion late this year.

Oil gathering system additions in several areas of the state and modernization of pumping stations combined to bring the Pipe Line Company's investment for the year to more than $11 million.

r Tomorrow

ıvested more than $138
and equipment—approxi-
ery barrel of oil produced
the year. (See Page 2). In
is large-scale investment,
omnissioned artist E. M.
ns and to paint in broad
ctivities showing where and
Schiwetz toured Baytown
plants; he roamed the
s with a geophysics crew;
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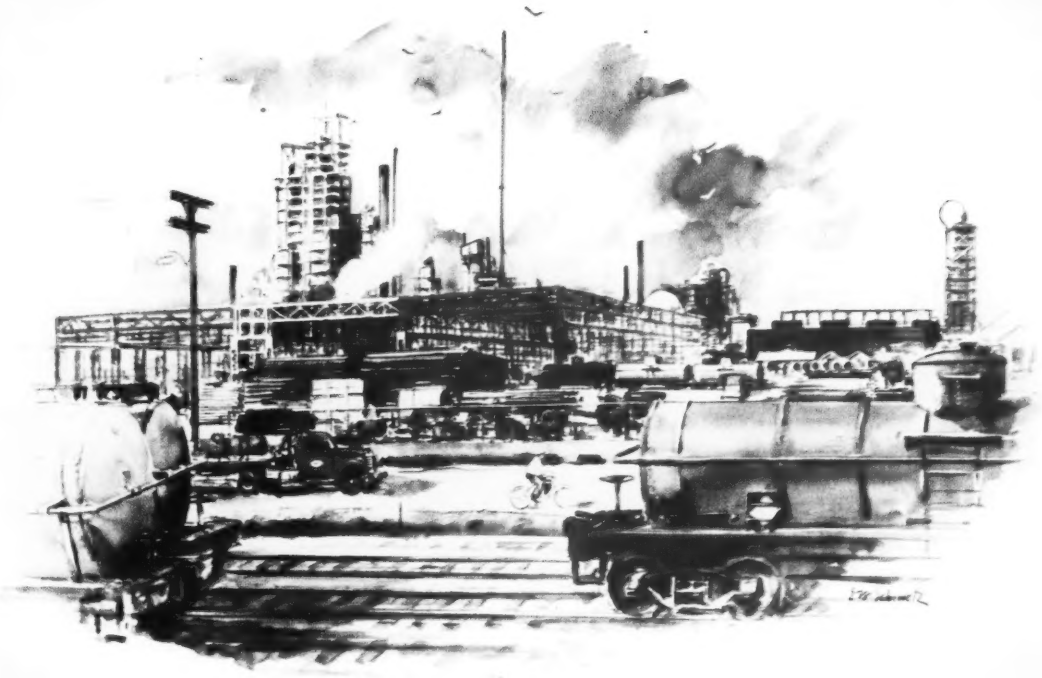
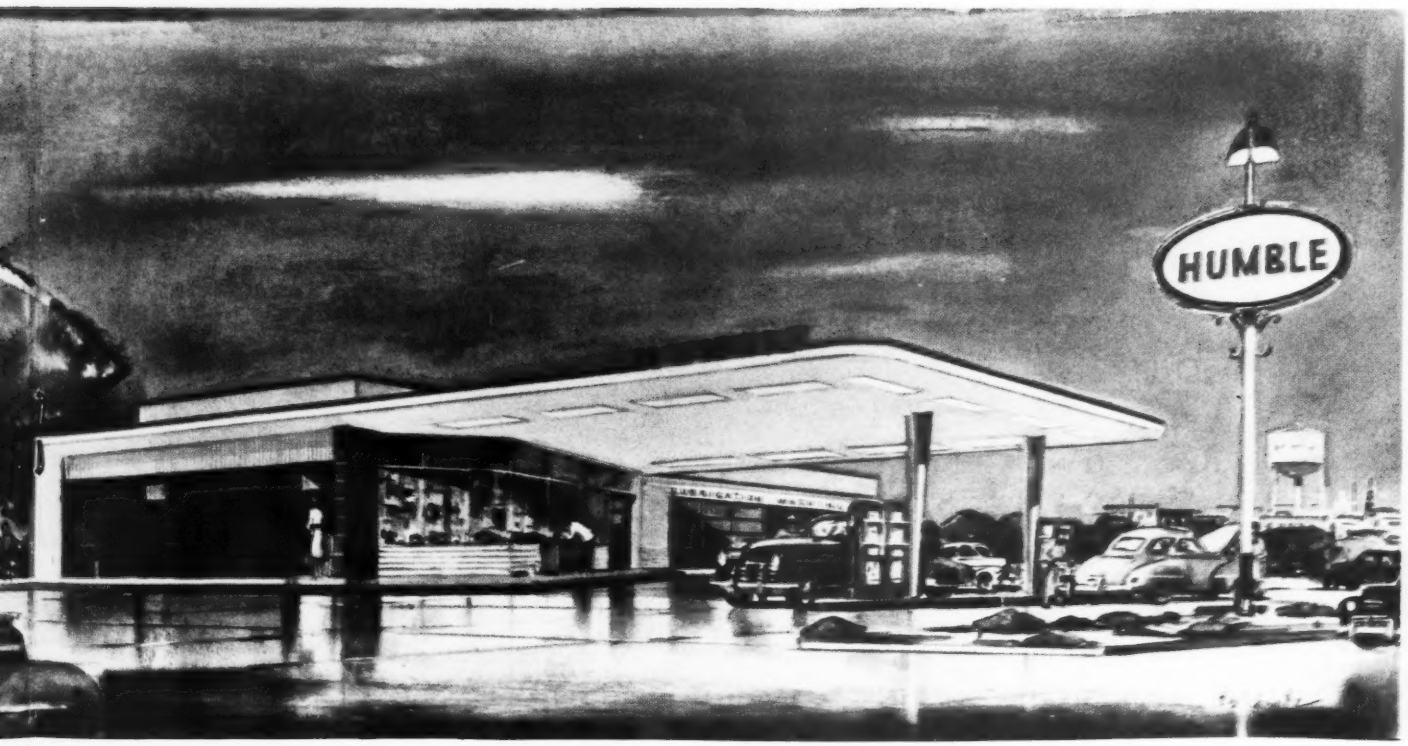
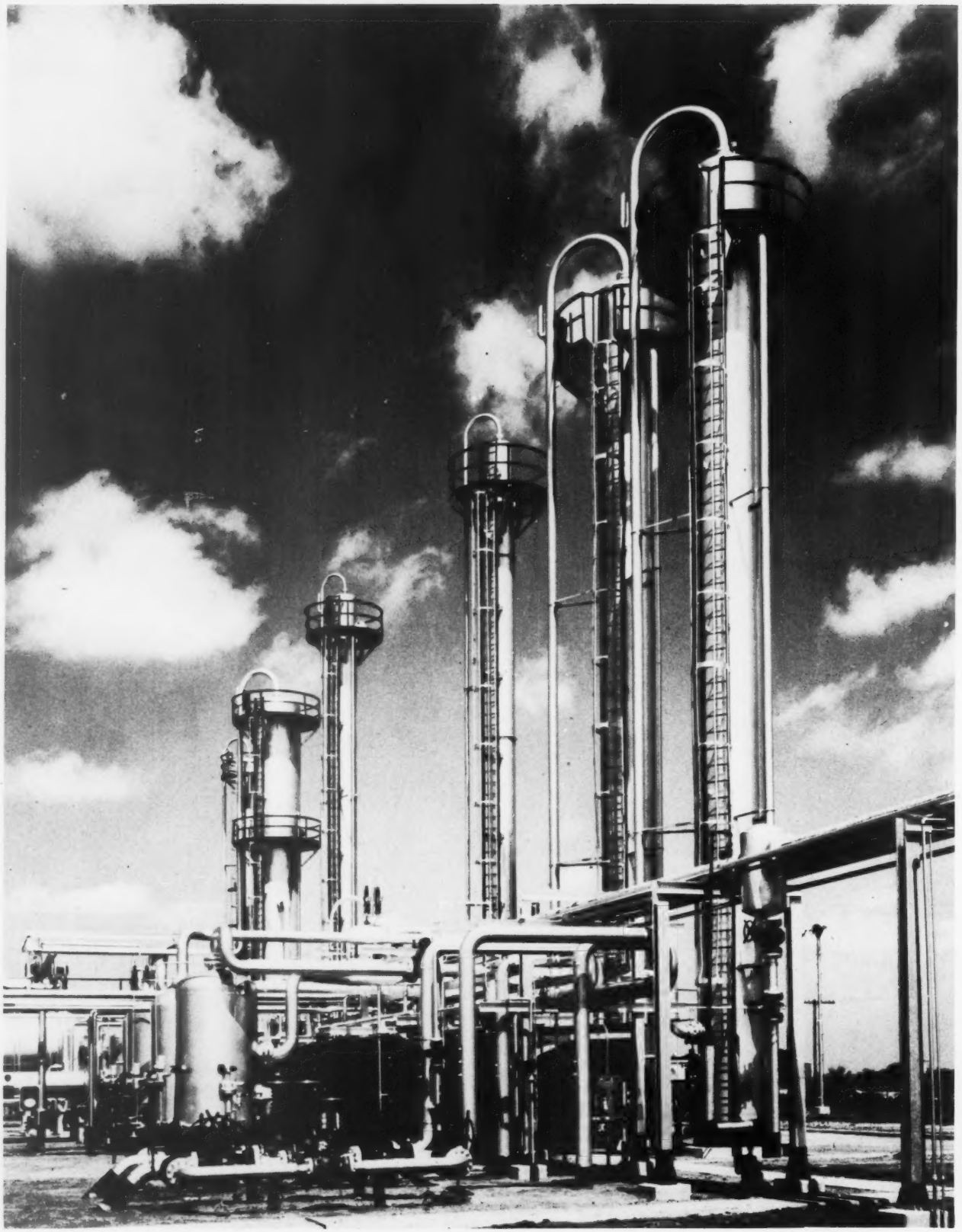


The steelwork pattern of the central shops at Baytown caught the artist's eye. It was one of several major construction jobs under way at the refinery.



Modern service stations, new bulk plants, and other sales and distribution facilities to bring quality products to more Texas motorists accounted for more than $4½ million investment.



Silver towers of the Clear Lake Natural Gasoline plant gleam in the South Texas sun. This is one of 138 new plants or additions built or building in the state since war's end to conserve and utilize natural gas and casinghead gas.

NATURAL GASOLINE PLANTS—

Symbols of the Increased Use and Conservation of Natural Gas

TALL, slender, silver columns rising above a maze of silver pipes and tanks have become familiar landmarks in many oil and gas fields of Texas and other states. They are trademarks of a booming industry-within-an-industry: the production of natural gasoline and liquefied petroleum gases.

Natural gas processing plants like the Humble Clear Lake plant (opposite page) have an importance little realized by most Americans. They are visible signs of the greater utilization and conservation of one of our most abundant natural resources.

From these plants come natural gasoline, liquefied butane, propane, and ethane for many uses. They supply motor and aviation gasoline blending stocks; heating fuel; and the raw materials for making plastics, paints, chemicals, synthetic rubber, fertilizers, and many other things in our present-day life. In most plants, after these valuable liquid products are removed from the inlet gas, the dry residue gas is entirely utilized—some of it as plant and lease fuel, feed stock to carbon black plants, to supply the fuel sales demands of gas transmission systems, or for gas-lifting oil production.

In some cases, where the market and need for the plant residue gas has not yet been developed, this gas is conserved for future use by compression and injection into underground reservoirs. Full conservation has not been reached. Some casinghead (gas produced with oil from oil wells) cannot now be conserved economically because it is produced in small oil fields, many of them in remote areas, and the volume does not justify the cost of equipment to gather and process the gas. However, the casinghead gas conservation projects already completed are a significant advance toward the goal of full conservation within economic limits.

Plant facilities for processing natural gas were greatly expanded to supply the World War II need for light hydrocarbons and to conserve the casinghead gas produced with record volumes of oil. At present more than 500 plants in the United States process nearly 15 billion cubic feet of gas daily.

Postwar expansion of gas processing and conservation facilities in Texas has included 138 new plants or additions since 1945. A major part of the facilities of all of these new plants will be dedicated to the conservation of casinghead gas, and some of them will have no other function than to return gas to the ground for future use. Most of the 138 new plants in Texas are now complete, and by 1950 they will be conserving nearly two and one-quarter billion cubic feet of casinghead gas daily. This giant construction program represents an oil industry investment of more than a quarter billion dollars for Texas alone.

Until World War II, liquefied petroleum gases, such as propane and butane, were not in great demand, although natural gasoline had been extracted from natural gas in Pennsylvania as far back as 1904. From that time to the present, the major product of gas plants has been natural gasoline, which is used in blending motor gasoline. The demand for butane, propane, ethane, and other light hydrocarbon products from gas plants has greatly increased since 1941.

For a description of gas plant operation, see next page

Today these products constitute approximately one-half of the liquid hydrocarbon output of gasoline plants.

The great expansion of gas product recovery facilities received its initial impetus from the wartime needs for iso-butane for making alkylate, an essential ingredient in making high-octane aviation gasoline, and propane and butane to make synthetic rubber and other products. Requirements exceeded output of butanes and propanes from refineries, and existing gas plants were modified during the war to supply more of the desired light hydrocarbon liquids. The postwar development of the plastics industry and the manufacture of other new products from the liquefied petroleum gases have helped to further accelerate the gas plant expansion program.

Also, clean, dry natural gas transported by great transcontinental pipe lines became an easy competitor with coal as fuel in Eastern industries and homes. Liquefied petroleum gases (LPG) have brought the clean convenience of gas to millions of farm users. These many new customers have built up and are continuing to build up the demand for natural gas and for the products extracted from it.

Several other factors greatly affected the expansion of gas processing facilities. Oil production, to supply the unprecedented high demand for petroleum products, has been at record levels since 1945. Accordingly, there has been a growing need to conserve the casinghead gas produced with the oil. But that presents a unique problem. While every individual operator in a given field can produce oil independently and store it economically until sold, gas presents an entirely different problem.

Gas cannot be stored.

The facilities to process and utilize it are too expensive to permit each operator to make the necessary installations. Hence, field agreements have to be made between the several operators. As fast as these agreements can be arranged and as materials become available, today's conservation program is moving ahead.

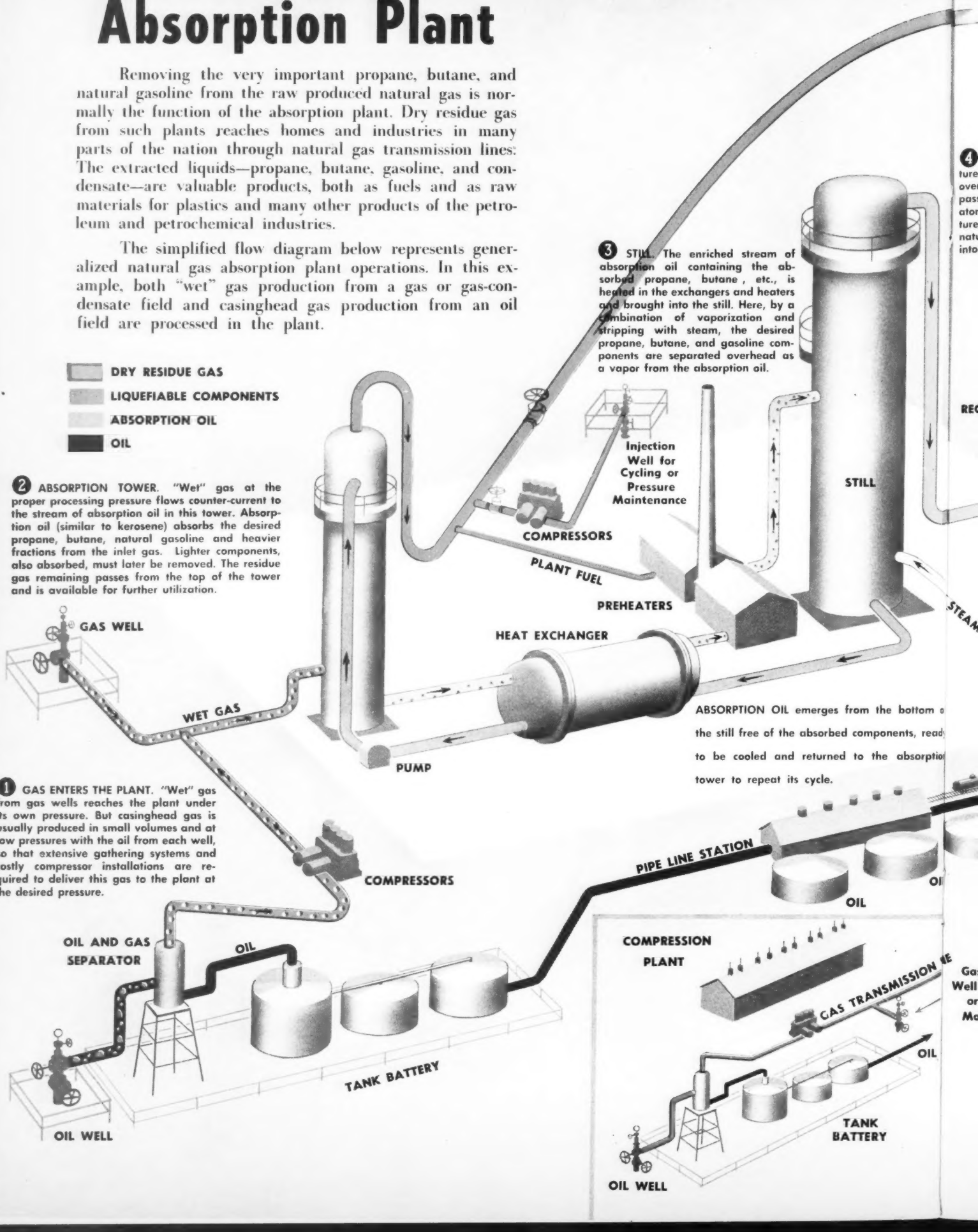
The Humble Company has always been interested in utilizing and conserving natural gas wherever possible. At the close of World War II, Humble was operating 12 plants and had an interest in three outside-operated plants. Today, in the midst of the post-war construction program, Humble operates 20 plants and has an interest in five more operated by other companies. Eight major new plants or additions are under way. When these construction projects are completed some time in 1950, Humble-operated plants, including the 450 million cubic feet per day capacity of the Katy plant, will be capable of processing more than one billion cubic feet of gas daily.

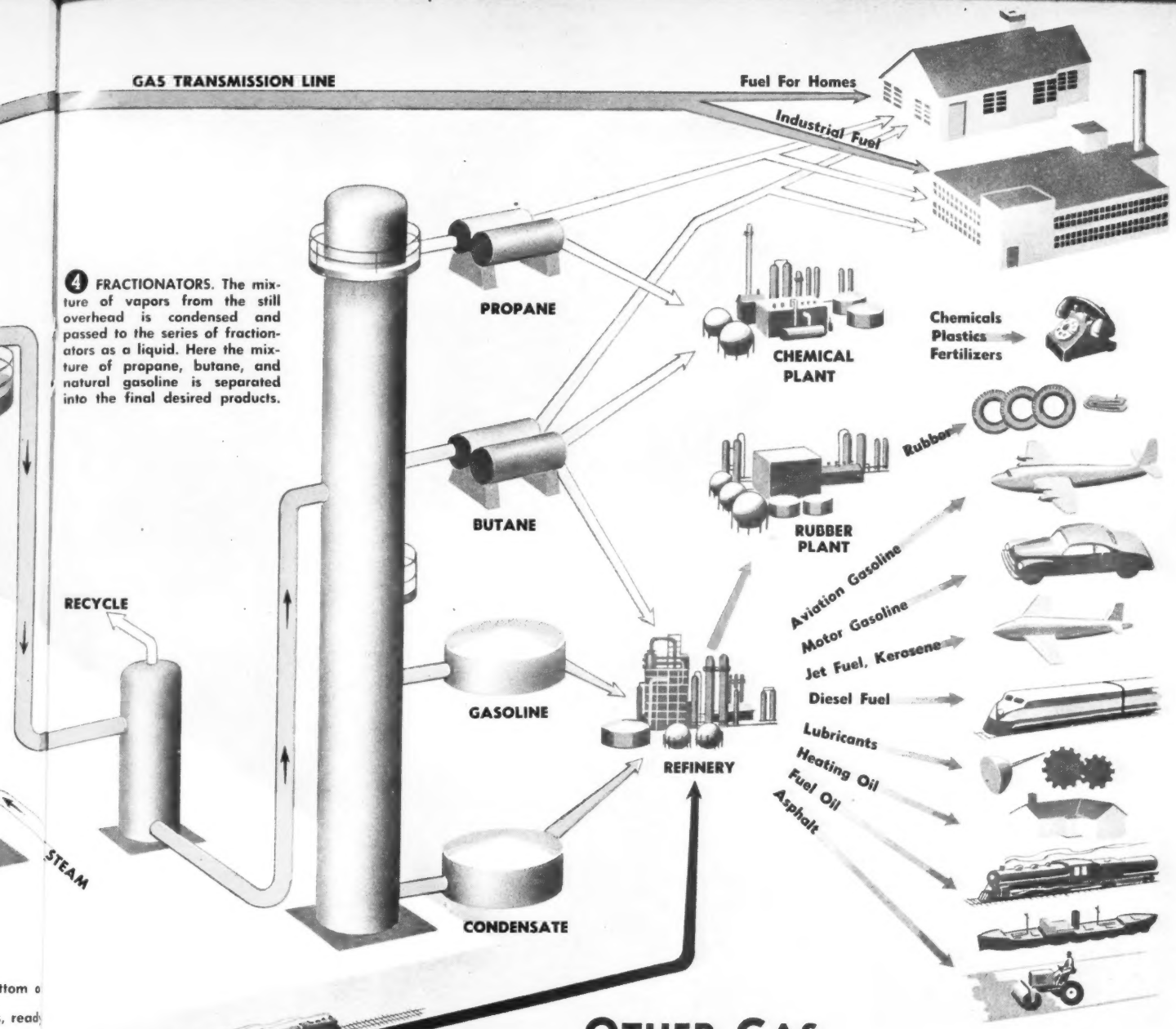
Natural gas plants are important to our better way of life—in better motor and aviation gasoline, in the myriads of plastics used every day, in clean and convenient natural gas and liquefied petroleum gases used in homes and industries as fuel, and for the conservation of this abundant natural resource for the continued enjoyment of these great gifts.

A Natural Gas Absorption Plant

Removing the very important propane, butane, and natural gasoline from the raw produced natural gas is normally the function of the absorption plant. Dry residue gas from such plants reaches homes and industries in many parts of the nation through natural gas transmission lines. The extracted liquids—propane, butane, gasoline, and condensate—are valuable products, both as fuels and as raw materials for plastics and many other products of the petroleum and petrochemical industries.

The simplified flow diagram below represents generalized natural gas absorption plant operations. In this example, both "wet" gas production from a gas or gas-condensate field and casinghead gas production from an oil field are processed in the plant.


DRY RESIDUE GAS
LIQUEFIABLE COMPONENTS
ABSORPTION OIL
OIL
3 STILL. The enriched stream of absorption oil containing the absorbed propane, butane, etc., is heated in the exchangers and heaters and brought into the still. Here, by a combination of vaporization and stripping with steam, the desired propane, butane, and gasoline components are separated overhead as a vapor from the absorption oil.
Injection Well for Cycling or Pressure Maintenance
STILL
COMPRESSORS
PLANT FUEL
PREHEATERS
HEAT EXCHANGER
2 ABSORPTION TOWER. "Wet" gas at the proper processing pressure flows counter-current to the stream of absorption oil in this tower. Absorption oil (similar to kerosene) absorbs the desired propane, butane, natural gasoline and heavier fractions from the inlet gas. Lighter components, also absorbed, must later be removed. The residue gas remaining passes from the top of the tower and is available for further utilization.
GAS WELL
WET GAS
PUMP
ABSORPTION OIL emerges from the bottom o
the still free of the absorbed components, read
to be cooled and returned to the absorptio
tower to repeat its cycle.
1 GAS ENTERS THE PLANT. "Wet" gas from gas wells reaches the plant under its own pressure. But casinghead gas is usually produced in small volumes and at low pressures with the oil from each well, so that extensive gathering systems and costly compressor installations are required to deliver this gas to the plant at the desired pressure.
COMPRESSORS
PIPE LINE STATION
OIL
OIL AND GAS SEPARATOR
OIL
TANK BATTERY
OIL WELL
COMPRESSION PLANT
GAS TRANSMISSION
OIL
TANK BATTERY
OIL WELL



OTHER GAS PROCESSING OPERATIONS

Compression Plants In the absorption plant (above), low pressure casinghead gas is compressed to a suitable pressure for absorption. In fields where the percentage of propane, butanes, and gasolines in the produced gas is too small to justify absorption operations, only compression plants are installed. These vary from a single unit to a battery of compressors, depending upon the volume of gas to be handled. Compression plants are designed to raise the produced gas pressure sufficiently for direct sale to a gas transmission line, for return to a gas-bearing formation for future use, or for gas-lifting oil production.

Cycling Plants Discovery of large gas-condensate reservoirs has motivated the development of cycling plants in recent years. To achieve maximum recovery from most reservoirs of this type, it is necessary to maintain the reservoir pressure. Accordingly, in a cycling plant, absorption operations are carried out at very high pressures—as near to the formation pressure as practicable. Thus, after the liquefiable components are extracted from the gas the dry residue gas is compressed to reservoir pressure for return to the formation. Reservoir pressure is maintained and the dry injected gas pushes the "wet" gas to the producing wells so that it may also undergo the cycle.

Pressure Maintenance Casinghead gas from oil wells is compressed in this type of plant for return to the oil producing formation to maintain sufficient pressure for maximum oil recovery. Depending upon the liquefied content of the produced gas, the pressure maintenance plant will be either an absorption and compression plant or will be only a compression plant where no liquids are extracted.

Gas Injection Well for Storage or Pressure Maintenance

Family looks at maps and literature in preparation for Mexico vacation trip.

HELP FOR TRAVELERS

Humble Touring Service Provides Year-round Aid to Motorists

"GREAT spring weather, isn't it? A fine day to be going somewhere!" The Humble driveway salesman was chatting with one of his regular customers.

"It sure is," came the reply. "Just last night my wife was talking about taking a trip; wants me to take her to Mexico. Do you have any road maps?"

"Yes, sir," the salesman said. "But say, wait a minute; if you are going to Mexico, you need more than just a road map. Why don't you let Humble Touring Service help you map your trip? They have a staff of travel experts who keep up-to-the-minute information on road conditions. They will send you a complete set of maps with the best route marked, and literature that tells about points of interest along the way. It sure will help to make your trip more pleasant."

"Sounds like a good idea," the customer agreed. "What does it cost?"

"There is no charge at all," the salesman assured him. "Just a minute."

In a moment the salesman returned holding out a card.

"All you have to do is fill in this postage-free card; tell when you are leaving, where you are leaving from, where you are going, what general route you would like to travel, and how many days you expect to be gone. The Touring Service will do the rest," the salesman said.

"Say, that sounds good!" the customer smiled. "I'll fill this in right now."

A few days later he was back in the station.

"Look here," he exclaimed as he began extracting maps and pamphlets from a large envelope. He spread out a Texas road map on which the route to Laredo had been marked and then held up a card and said: "This is an introduction to your Touring Service in

Many travelers are helped every day by Humble Touring Service in Laredo.

Laredo where we can get help with our Mexico entry papers, money exchange, car insurance, and Mexico road information. And here is our Mexico road map," he continued as he began tracing his fingers along the route which was marked on it. "Right on down to Acapulco on the Pacific Coast, with stops along the way."

"Now when we start back, we will come over this way through Toluca, Morelia, Guadalajara, San Luis Potosi, and back to the Pan American Highway where we will branch off at Cuidad Victoria and go to Brownsville."

By this time the salesman had begun to share the man's enthusiasm. "I see you got your literature on Mexico, too," he said.

"Sure did!" was the answer. "Look at these, will you? Highlight information on all the places where we want to look around some. And this card is another introduction to your Touring Service at Brownsville. They will give us any information we might need to get home from there, or information about side trips along the way. This *Trip Log* is for keeping track of expenses on the trip. Got that windshield sticker on the car that says, 'I am a Texas Tourist,' too."

"Looks like you are ready to start," the salesman nodded in approval. "When are you leaving?"

"Next week," the customer announced. "And we certainly thank you folks for your help."

Beautiful San Sebastian church in Taxco was built by colorful Jose Borda who lost a fortune, regained immense wealth from silver found beneath hills of Taxco.

"It is always a privilege to serve you," the salesman smiled.

The case of this customer who had his trip to Mexico made easier and more pleasant is typical of hundreds of cases handled every week by the Humble Touring Service. The importance of such a service is substantiated by a national magazine which announced recently that more than one-half of the millions of people who make vacation trips every year travel by automobile.

Humble began modestly in 1933 to do something about helping travelers with their problems. The Touring Service was opened that year and 6319 people asked for maps and travel information. But as automobiles were improved and people began to travel farther, faster, and more comfortably over improved highways, requests increased rapidly. In 1948 there were 54,379 requests for help—almost nine times as many as 15 years earlier—and mail postmarked in Holland, Spain, Argentina, Chile, Brazil, Venezuela, Panama, Guatemala, Bermuda, Mexico, and Canada was no longer a novelty. Although

most of these foreign requests were for literature about the United States, many of the people making them indicated plans to travel in this country.

During these 15 years, the Touring Service staff has learned that there are two kinds of travelers—those who maintain steadfastly that a vacation is a time for resting; and those who want to see faraway places. The former want to get to the place of their choice as quickly as possible so that they can put on comfortable clothing and relax in the sunshine or perhaps catch up on fishing.

The other group, however, want to see a lot of new scenery; have looked forward to the trip for a long time; and have planned in some detail what they want to do. Both types are helped with equal ease, because the Touring Service maintains a wide range of literature and information.

For example, a man and his wife asked recently for a route that included many of the major points of interest in the western portion of North America. They wanted to visit all of the national parks in the area and a number of the leading cities. The trip, covering portions of twelve states and Canada, required a full month to complete, but marking the route and assembling literature was less than a 30-minute assignment.

Considerable preparation, of course, precedes the mapping of every trip for a traveler. A route is selected that will allow ample time to reach desired points of interest without creating a burden on the driver's endurance or that of his automobile. Road conditions are checked carefully.

This is particularly important if there is snow or ice on the ground, or if floods have closed highways or endangered bridges. During such emergencies, close contact is maintained with reliable sources to insure up-to-the-minute travel information. And motorists depend on this information. There were 1500 requests for information on highway conditions during the first five days of February when snow and ice blanketed much of Texas.

Helping the Touring Service to keep its information accurate combines the work of a great many people in distant places. Road condition reports are received directly from state highway engineers in every state as often as they are released; weather reports are received every day from 45 pump stations in Humble Pipe Line Company's system throughout Texas; local and out-of-state weather bureaus, state highway departments, and state highway patrols are also very cooperative.

A man stopped recently at the Touring Service seeking information on how to reach his brother at one of the Texas lake shore resorts. He didn't know the name of the lodge where his brother was staying, but his message was urgent: "tragedy in family." It was recommended that the State Highway Patrol might be able to broadcast the message via short wave to the patrol car in that vicinity. The man followed the suggestion, and within only a very short time the brother was informed of the emergency.

Frequently the Touring Service receives some of its best information from returning travelers whom it has served. These people either drop in to talk about their trips, or they write letters. It is this spirit of mutual helpfulness that makes the service dependable and the staff members' work interesting.

International Bridge serves as backdrop for Humble Touring Service lo-

Rugged beauty, startling landscapes, striking contrasts, strange animals and plants combine to make Big Bend National Park one of the unusual vacationlands in Texas.

Peace and quiet as reflected by this stone cottage nestled amid stately pine

cated in Brownsville service station at right. Here travelers get complete service.

Although the busiest season is from March to September, when most people make vacation trips, service is on a year-around basis. From about the middle of February to the latter part of March, motorists come in to buy their automobile license plates. This service is made possible through cooperation with the County Tax Collector's office.

In the early spring when Bluebonnets, Indian Paint Brushes, and other native wildflowers bloom profusely in uncultivated fields or along highways all over Texas, thousands ask for directions to the best fields. Many also want information about the East Texas Dogwood Trail, the Natchez, Mississippi, Pilgrimage where ante-bellum homes stand amid scenes of flowered splendor, and various other flower trails in the Southwest.

Sportsmen can buy hunting and fishing licenses throughout the year, and duck stamps during the winter hunting season. And when a motorist discovers that his driver's license needs to be renewed, he can obtain a renewal blank at the Touring Service.

The Touring Service in Laredo, opened in 1937, and the one in Brownsville, opened late in 1948, were established to keep pace with the increasing flow of vacation travel into Mexico. These offices work under the direction of and closely with the Houston office, help travelers with Mexico entry papers, tourist cards, money exchange, and furnish information on regulations covering pets, cameras, and firearms. They perform still another important service by handling insurance for travelers with Mexican companies, because American policies usually do not cover foreign countries. Travelers routed through Houston by the Laredo and Brownsville offices are invited to stop at the Houston office for additional help and information. And travelers routed into Mexico by the Houston office are invited to stop at the Laredo or Brownsville offices, for the travel experts at these two locations are especially qualified to give detailed facts on travel conditions in Mexico.

Typical of the information sought every day at any of the three Humble bureaus is exact distance between two points, and how this figure is arrived at. The answer is that mileage is figured from the court house in the town of departure to the court house in the town of destination. If there is no court house, the post office is the basis for calculation. Also, travelers frequently ask for suggestions on where to go for certain types of vacations, relying on the experience of Touring Service staff men.

Soon the highways that web the United States, Mexico, and Canada will blossom again with vacation travelers. Where will they be going? Mexico, as did the family discussed previously? New Orleans with its legendary French Quarter? Cape Cod with its picturesque New England atmosphere? The Canadian Rockies? Metropolitan New York or fabulous old San Francisco? An extended trip like that taken by the couple who visited much of the western portion of North America? A restful vacation in the Texas hill country or in one of the many fine state parks, perhaps?

Some folks will, of course, stay home, but as has been true for many years, millions of travelers will answer the call of the open road; will want to see new places and do new things; or revisit familiar and well-loved places. And Humble Touring Service will again share the pleasure of many of these people by helping them map their trips.

trees bring relaxation and a satisfying vacation to those who seek out retreat.

Trim sailing craft, urged across bay by gentle trade winds at Corpus Christi, make picturesque scene; give nautical-minded travelers chance to bask in sun.

Refinery Stillman Sees

PIPE LINE OPERATIONS

Paul H. Mears, left, inspects Humble Pipe Line Company's Satsuma Pump Station with H. H. Hetzler, chief engineer. Mears was impressed with station cleanliness.

THE lubricating oil for your automobile is made from crude oils which have certain desirable characteristics. From the time this crude oil leaves the ground until the motor oil made from it is sealed in cans, it is handled with utmost care.

One of the men at Humble Oil & Refining Company's Baytown refinery who knows about the care taken with these crudes is Paul H. Mears, stillman first class and Humble employee for 25 years. Mears works in the distillation department—on those units which first process crude oil after it is delivered to Baytown refinery by Humble Pipe Line Company. At these units heat and pressure are applied to break the crude oil into light and heavy fractions, and Mears can tell you about the great care taken to separate exactly the right "cuts" for lubricating oil.

He would tell you first, however, that the crude oil must be uncontaminated — unmixed with other grades — when it reaches the stills. The important job of getting it there in such condition belongs to Humble Pipe Line Company, and Mears had an opportunity to see how it is done recently when he visited pipe line operations.

Mears began his look at Humble Pipe Line Company's operations at Satsuma pump station, about 20 miles outside Houston on the Hempstead highway. There he met the station's chief engineer, H. H. Hetzler, and Mears' first question brought a brief explanation of how the pipe line system works.

The question was "How do you bring such large amounts of different kinds of crude oil to us at Baytown refinery and still keep it unmixed?"

The chief engineer answered as the two walked about the station and tank farm. "First of all, small gathering lines in oil fields all over Texas bring the oil to pipe

line sub-stations," he began. "Then, when ordered, the oil is pumped through lines to large storage tanks, like the ones you see here, at mainline pump stations. Each different grade is kept in a different tank until orders come to move it through the line. Then it enters the pipe line immediately behind the preceding grade, and constant pressure causes it to push the other grade ahead of it through the line. Only a very small amount at the point of contact becomes mixed."

Hetzler then showed Mears samples of the many hourly and daily reports submitted by all pipe line stations, explaining that these reports give the chief dispatcher in Houston the necessary information for issuing crude oil movement orders. The reports are sent via the Pipe Line Company's private communications system. All circuits of the system total more than 16,500 miles in length.

The chief engineer then showed Mears the pump station, which, like all others on the line, was sparkling clean. It was so spotless, in fact, that Mears said "I've never seen a place where heavy machinery is in constant operation that's so clean and neat. You fellows must be proud of your station."

Before leaving, Mears inspected the beginning of the 20-inch pipe line built in 1948 to carry from 75,000 to 233,000 barrels of oil a day directly from Satsuma to Baytown refinery. He also looked over the many storage tanks near the station, and Hetzler explained that Satsuma receives oil coming in through the pipe line in one or more storage tanks, and pumps oil on down the line from different tanks. Thus stations like Satsuma are able to measure the amount of oil both coming in and going out, making them "check stations."

Mears next visited an "over and short" station at Navasota, the next pump station on the main line carrying oil to tidewater. At this type of station, he learned, the stream of oil is received into and pumped out of the same tank. Hence there may be a fluctuation in the level of oil in the tank, which gives the operation the name "over and short." The function of the over and short station is to act as a booster and keep the oil moving through the line at proper rate and pressure. In case pumping service is temporarily interrupted, it also provides storage for oil coming in through the lines until pumping can be resumed.

The next point visited by Mears was another "check station" at Hearne, where the West Texas - Panhandle and East Texas systems converge. Again he showed his interest in the different grades of crude oil. "How do you know when a different grade of crude oil arrives through the lines?" he asked R. E. Leslie, chief engineer.

"By testing the contents of the line," was the answer. "Of course, the dispatcher informs us of the approximate time it will arrive, but we start testing an hour ahead of time. When it begins to come through in unmixed form, the stream is switched by a manifold system into the right tank."

After looking over the manifold system, Mears went to the nearby Hearne station on the products pipe line which extends from Baytown refinery to North Texas. Here he viewed a modern station with all pumping units controlled from a "push button" panelboard. The products pipe line stations work in much the same way as stations handling crude oil, but they pump three different grades of gasoline. Near the pumping station is a products terminal, where Mears saw tank trucks being loaded with gasoline for distribution to bulk and service stations in the surrounding territory.

Proceeding up the line past Chilton, an "over and short" station, Mears visited briefly at Pendell, a similar type of station, located northwest of Waco. Here he inspected the auxiliary units which are usually maintained at all pump sta-

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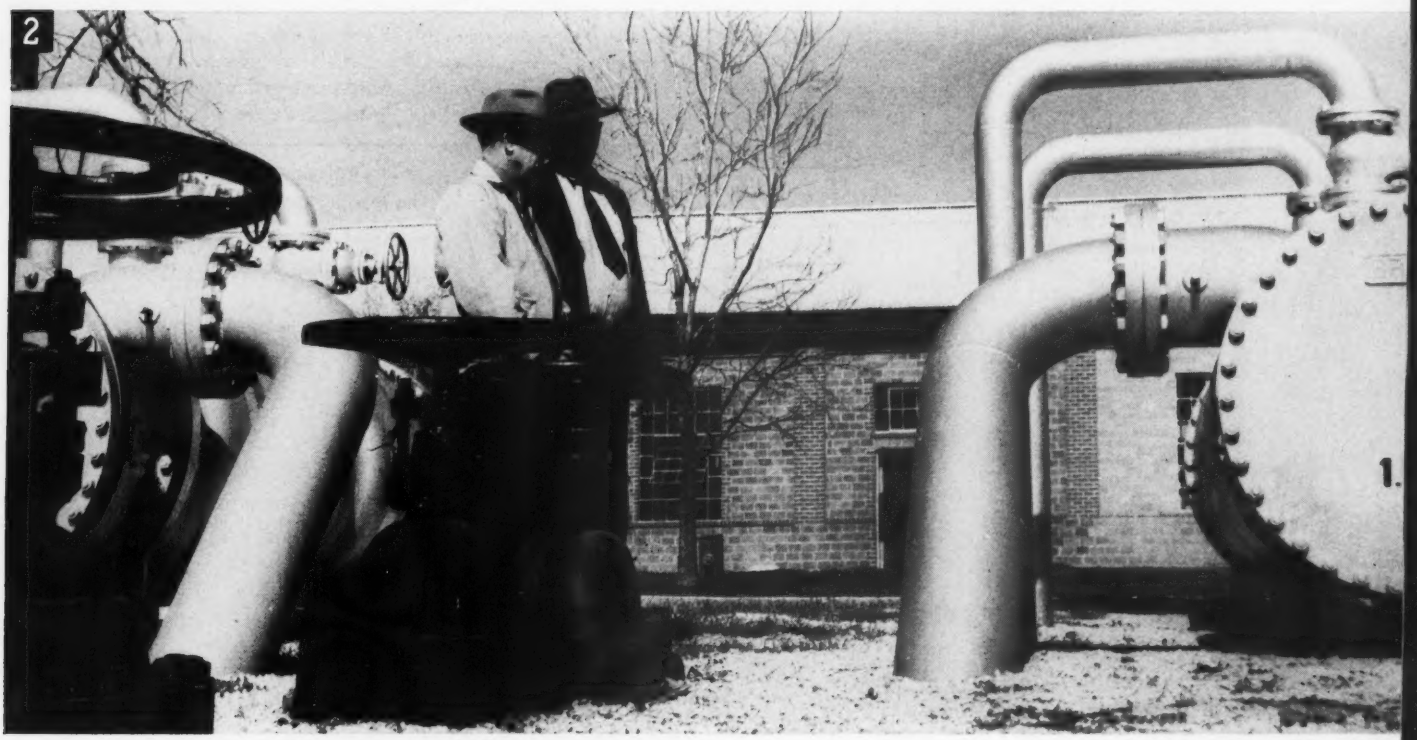
At Navasota station, Mears learned about "over and short" operations from P. R. Williams, chief engineer with 48 years' pipe line experience.



H. A. Young, telegraph operator, and R. E. Leslie, chief engineer at Hearne Station, explain how hourly reports to chief dispatcher keep operations on schedule.

Mears was chosen to make the tour shown on these pages by a drawing. Names of all 20-year stillmen were in the hat, and J. S. Palmer, Joe E. Reilly, H. Frank Goss, and William Grant, Jr., conducted the drawing.

tions for emergencies, and the neat company cottages where station employees and their families live.

The last point visited was Comyn station, north of Comanche, where lines from West Texas join the Panhandle system. At Comyn, Mears found the same type of operations he had seen at Satsuma and Hearne, and the same type of brightly clean station.

Here he learned that it requires about a week to move a shipment of some particular grade of crude oil from Comyn to Baytown. The shipment must be started in advance in order to insure that it will reach the refinery on time.

"So you have to make sure the oil moves on schedule as well as keeping it unmixed," Mears remarked. "I didn't realize what an effort it takes to transport crude oil to refineries."

Thus Mears ended his long sweep of pump stations by automobile, and a few days later completed his view of Humble pipe line operations by "flying the line."

Low-flying pilots cover Humble Pipe Line Company's main arteries once each week, in addition to making emergency trips, checking for leaks. For a birds-eye view of pipe line right-of-way between pump stations, Mears joined one of the five pilots for a trip from Baytown to Satsuma. He learned that a crude oil leak will make a brown spot on the earth; a gasoline leak will show up as a ring of dead grass and vegetation. He and the pilot found no leaks, but if they had, they would have circled and dropped a note to operators at Satsuma station.

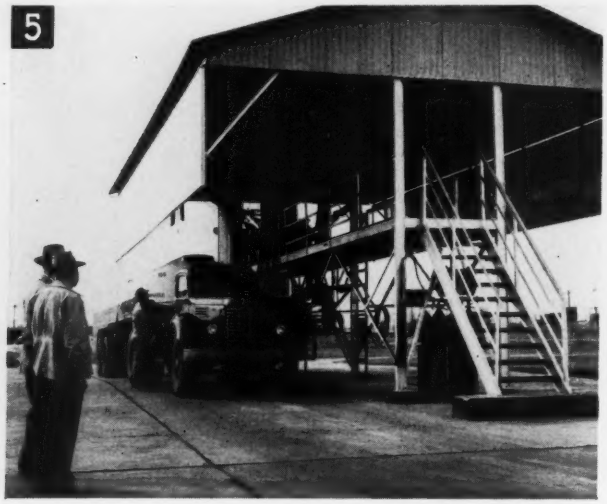
Back on the ground, Mears summed up his feelings about his auto and airplane review of pipe line operations.

"I learned a great deal about pipe line work, but there is one thing I particularly remember. You know, no one unit or group of men at the refinery makes any finished product—it takes them all, working together as a team. Humble Pipe Line Company has the same kind of team, even though units of the team are miles apart at different stations.

"This oil business takes a lot of men working together as teams, and a lot of teams, to do the job."

Push-button controls operate the products pipe line pump station at Hearne, Chief Engineer H. B. Scott explains.

Mears also visited the Hearne products pipe line terminal, where he saw trucks loading gasoline from Baytown refinery.



At Pendell pump station, Chief Engineer L. N. Stevens showed Mears through company housing area, (background).

At Comyn station, where pipe lines from West Texas join Panhandle system, Mears looks over cooling water supply.

W. J. Dickey, acting chief engineer at Comyn, explains how to gauge a storage tank to tell amount of oil it contains.

To conclude his trip, Mears joined Pilot R. R. Roberts for a flying trip over a section of the main lines. (below).

By the way...

Retirements

Since the last issue of THE HUMBLE WAY, eight Humble employees have either reached normal retirement age or have taken advantage of the early voluntary retirement feature of the Annuity & Thrift Plan. Included in the group are four Pipe Line Company employees and two each from the Production and Refining departments.

Retired from Pipe Line Company are ROBERT W. GREEN, assistant district gauger at Talco, on April 2 after more than 20 years service . . . JOHN W. HOLTZ, master mechanic of Master Mechanics, on April 12 after more than 28 years service . . . CARL LARSEN, field engineer at London, on April 14 after more than 29 years service . . . and OTIS MONTGOMERY, engineer, Main Line C at Viola, on April 17 after more than 20 years service.

From the Production Department, LAMARQUE M. DUHON, pumper gauger at Imogene, retired on March 1 after almost 20 years service . . . and WILLIAM A. NICHOLS, roustabout at Thompson, on March 21 after almost 27 years service.

At Baytown Refinery, CLARENCE PHILLIPS, locomotive crane operator, retired on April 14 after more than 28 years service . . . and HORTENSE G. STAFFORD, chief telephone operator, on April 14 after almost 28 years service.

Deaths

Thirteen active employees and four Humble annuitants have died since the last issue of THE HUMBLE WAY.

Employees who have died are WILLIAM M. BAKER, 53, guard at Baytown Refinery, on February 19 . . . JOHN O. BURCH, 54, district electrical foreman, Galveston Bay Production, on February 13 . . . JEFF B. COWINS, 39, laborer at Baytown Refinery, on February 15 . . . ROY EDWARDS, 53, mechanic first class at Odessa, on March 14 . . . SHIRLEY L. GRESHAM, 54, assistant clerk, Pipe Line Oil Accounting, Houston, on February 13 . . . VIRGIL O. HARRIS, 41, district superintendent at Lovell Lake, on March 29 . . . CHRISTINE PRINCE HILL, 47, assistant to supervisor, personnel division of Employee Relations, Houston, on February 19 . . . PERRY N. MASK, 48, welding supervisor, Baytown Refinery, on February 19 . . . BRUCE MILLER, 45, engineer at Putnam, on February 19 . . . JACK PONDER, 61, roustabout at Hardin, on March 5 . . . ROBERT S. ROUNTREE, 54, pumper-gauger at Friendswood, on March 16 . . . LESLIE P. SALTER, 53, senior zone supervisor, Baytown Refinery, on February 19 . . . and JOHN B. STAMEY, 51, division chief clerk, Louisiana division office, on March 18.

Annuitants who have died are: LEONARD H. ATTWELL, JR., 73, Comptroller before his retirement, died on March 15 . . . MRS. MARGARET SCHEM EGGLING, 59, janitress in building maintenance before her retirement, died on February 11 . . . ALBERT B. LANGSTON, 65, pumper-gauger at London before his retirement, died on March 7 . . . and HEC F. MCCORD, 71, district gauger at Pierce Junction before his retirement, died on February 14.

A complete index of HUMBLE WAY articles is now available. The printed reference material is arranged alphabetically and topically, and covers all articles, paintings, and color photographs published since the magazine was started four years ago. If you would like a copy of the index, please fill in the form below and mail it to THE HUMBLE WAY, Humble Oil & Refining Company, Box 2180, Houston 1, Texas.

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Anchor chain for LST drilling tenders, piled up at Humble's Grand Isle offshore operations base, made an interesting pattern for photographer Mel Coston. The chain weighs 39 pounds per foot.

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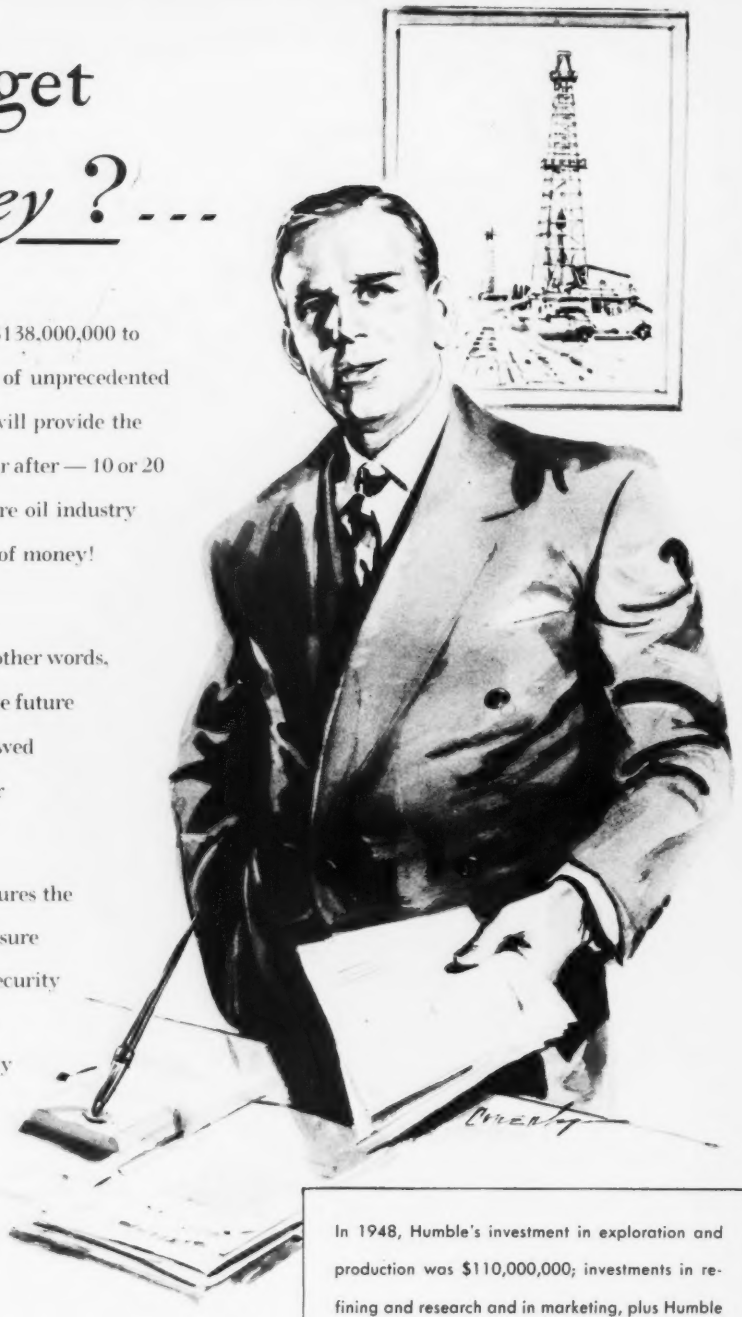
Where do we get *the money?*...



During 1948, the Humble Company spent about $138,000,000 to help provide the oil America needed in that year of unprecedented demand, and to develop the oil resources which will provide the oil we need not only today, but next year, the year after — 10 or 20 years from now. The 1948 investment by the entire oil industry was approximately 2 billion dollars. That is a lot of money! Where did it come from?

The larger part of it is reinvested profits. In other words, American oil companies have such confidence in the future of their industry in this country that they have plowed their profits back into the business, just as a farmer plows under a good green cover crop.

And for the same reason: the farmer thus assures the continuing fertility of his soil; the oil companies assure the continuing success of their business . . . the security of the jobs of their employees, a continuing supply of oil for America's needs, the immediate availability of oil for national emergencies. The major portion of profits made in the oil country stay in the oil country to develop its resources, and to supply a market for its industries. *In the last 10 years, over half of all the profits of oil companies have been reinvested in the business.*

In 1948, Humble's investment in exploration and production was $110,000,000; investments in refining and research and in marketing, plus Humble Pipe Line Company's investment in pipe lines, amounted to $28,000,000 . . . **All this money came from earnings retained in the business.**

HUMBLE OIL & REFINING CO.